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Quote on front cover: T. Harry Williams,
The History of American Wars

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Purpose The *Air Force Journal of Logistics* is a non-directive quarterly periodical published in accordance with AFR 5-1 to provide an open forum for presentation of research, ideas, issues, and information of concern to professional Air Force logisticians and other interested personnel. Views expressed in the articles are those of the author and do not necessarily represent the established policy of the Department of Defense, the Department of the Air Force, the Air Force Logistics Management Center, or the organization where the author works.

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Taken for Granted

Major General Theodore D. Broadwater
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Throughout history the problem faced by the military logistician has been: How to insure the forces supported have the necessary combat materiel and equipment ready for their use *when and where* it is needed. This same problem still prevails in today's world and solving it is what our profession calls us to do. Even though our objectives may remain the same, the complexity of the task has increased in proportion to the complexity of the combat arms and the increasing scope of our national security objectives. The translation of national security objectives into military objectives and supporting strategy provides the baseline to begin the development of the logistics plans and programs necessary to support that national objective.

At best, the initial planning and programming work necessary to turn purely documentary requirements into tangible, usable logistics resources in operational units is often taken for granted; at worst, it has sometimes been misunderstood or considered of secondary importance to combat readiness. This article will briefly examine the planning and programming function at the HQ USAF level, identify specific areas of responsibility, processes, actors and some basic operating philosophy of the Air Staff, and gauge the general scope and relative success of the logistics job in this area in recent years.

On the Air Staff, the Directorate of Logistics Plans and Programs, DCS/Logistics & Engineering, or, AF/LEX, has the responsibility for logistics planning in support of our military strategy as well as programming the resources (dollars) necessary to accomplish that strategy. The end result of these efforts determines the Air Force's ability to sustain and maintain its combat forces. This is not simply the end result, but *the* objective—to sustain and maintain.

". . . the complexities of the process defy easy "nutshell" explanations."

The relationship of planning and programming is inseparable. Programming the resources necessary to support our forces begins with the development of operational plans to counter military threats and the conversion of OPS plans into specific Air Force hardware requirements and the services needed to execute those plans. The Air Staff generally receives requirements sent from the Major Commands (MAJCOMs) to the DCS/Plans and Operations or DCS/Research, Development and Acquisition. Once requirements are validated, Action Officers, or AOs, are assigned the role of guiding their new program (previously, the written requirement) through the complex process which—hopefully, if the program is worthy—culminates in a funded or budgeted program. For requirements involving logistics support, the AOs must work closely with the programmers of the Directorate of Logistics Plans and Programs. That team then is responsible for developing the requirement into a defensible program. This close alliance eventually results in the Air Force Program, or POM (Program Objective Memorandum) a prioritized list of hundreds of programs for the next five years. Then, after close scrutiny by OSD and OMB analysts, data for the first year of the POM is transformed into the Air Force portion of the President's Budget submitted in January of each year. This, in a nutshell, is the continuous process of the Air Staff. But in reality the complexities of the process defy easy, "nutshell" explanations.

"Programming is basically the forecasting and allocation of resources to support operational requirements. . . ."

Just what then is the "programming" done by "programmers" which plays such an important role in this process? And, what is the role of AF/LEX? First, the common perception of rows of individuals sitting at computer terminals inputting data is neither the lot of AF programmers nor the prime role of AF/LEX. Programming is basically the forecasting and allocation of resources to support operational requirements, be they weapon systems, spares, POL, supplies, or transportation. Therefore AF/LEX is the principal funding advocate for most resources used by the logistics community throughout the Air Force to, in turn, support the fighting force. Spare parts and bench for aircraft/missiles/communications-electronics systems, equipment for shop use, kits for aircraft/missile/equipment modifications, munitions, vehicles, and even portable shelters are examples of logistic items programmed in AF/LEX. An exception to this is the category of military construction and related resources; their advocate is the Directorate of Engineering and Services, AF/LEE.

The term "advocate" is used deliberately in the examination of the allocation process. The Air Staff functions through these formal and informal systems of advocates. These individuals are the persons who guide programs through the complex funding process (or who control the purse strings), determining whether a program receives enough money to progress, die, or just 'bob" along year after year. Advocacy is a necessity of life in the Pentagon. AF/LEX, then, is the staff advocate for logistics throughout the Air Force—*formally,* for those items mentioned above and, certainly, *informally* for other logistics resources such as personnel.

Ultimately, the balanced development and funding of all logistics programs necessary to support the Air Force is the measure of success for AF/LEX. After receipt of MAJCOM requirements, the Directorate begins the task of determining which requirements are to be included in the program consistent with guidance from the Office of the Secretary of Defense. Unfortunately, not all requests can be satisfied. The criteria used to make these decisions are not strictly subjective; they include current Air Force priorities, the strength of the need as justified by the MAJCOM, Congressional concerns, and, most important, dollar and personnel limitations. Each criterion singularly or in concert

with others influences which requirements are initially included in the early stages of program formulation.

"Advocacy is a necessity of life in the Pentagon."

After the requirements are correlated and validated through various Air Staff offices to insure that logistics support elements are synchronized with operational requirements, such as projected flying hours, training objectives, combat sustainability objectives, and exercise schedules, the pace quickens. AF/LEX programmers then develop five year resource, or funding, profiles for their programs along with short, descriptive narratives. These documents, called Program Decision Packages or PDPs, become the vehicles used by the Air Force Board Structure (the "corporate bodies" of the USAF) to prioritize the various requirements of the Air Force in a specific POM period, e.g., FY 83-87. Programmers continuously refine the PDP resource data throughout the cycle based on decisions made by the board structure regarding program alterations, re-prioritizations, and/or consolidations. These major refinements are called "Exercises."

The programmer's role in each exercise is to monitor the program, develop alternative profiles, assess the program's impact on operational capability, and justify it through answers to endless questions from individuals within and outside the DOD.

An example of a current logistics program is the prepositioning of materiel and equipment in Southwest Asia (SWA) to support our national commitment in that part of the world. This continuing effort, initiated by the AF/LE staff, is intended to preposition sufficient resources in SWA to support our people in a bare base and hostile environment. These resources not only include combat materiel but critical personnel support requirements such as rations, portable facilities, water purifying and drilling equipment, etc. One of the major advantages to this effort is the savings, through prepositioning, of critical strategic airlift sorties which would otherwise be expended should our forces be deployed to that theater. This program "survived" the stringent review processes through the Air Staff, the OSD, and the Congress. The dollars were authorized and appropriated by Congress in December 1981. The Air Force Logistics and Engineering community continues to program funding to support this initiative.

The above actions are accomplished simultaneously while the AF/LEX staff is managing their resources, or executing budgets from preceding years and defending the current budget before Congress. This entails preparing for and reviewing Congressional testimony or actions, monitoring obligations to insure various OSD and Congressional restrictions (and Public Laws) are not violated, issuing Procurement Authorizations (PAs) to enable MAJCOMs to obligate appropriated dollars and insuring, through various automated reports, that the monies are being used as Congress, OSD, OMB, and the Air Force intended.

"Resource procurement activities demand specialized attention . . . ."

Resource procurement activities demand specialized attention and are managed through aggregations called Budget Programs. Aircraft/missile modifications, spares, support equipment, munitions, vehicles, and electronic/telecommunication equipment are examples of the Budget Programs managed by AF/LEX. Additionally, DPEM, or Depot Purchased Equipment Maintenance, and AFLC Civilian Manpower, each part of Major Force Program VII of the Air Force Operation and Maintenance account, are also programmed, managed, and defended by AF/LEX in conjunction with AF/ACB. In the Air Force's 1983 POM, AF/LEX programmed in excess of 14 billion dollars, in these areas alone. That figure was 18% of the total Air Force Program. The remaining program dollars included such categories as weapon system acquisition, R&D, military personnel, and operation and maintenance, travel, etc.

During the FY 83-87 POM cycle logistics support programs received high priority. Aircraft replenishment spares and munitions, to name a few, were high in the Air Force's Program because of their direct contribution to the readiness and sustainability of our forces, a contribution which is recognized by Air Force, OSD, and Congressional leaders.

At this point, the Air Force is about midway through a decade long shift that has been occurring and is planned for logistics resources. The figure on page 4 illustrates logistics and engineering and service dollars as a percent of Air Force Total Obligational Authority (TOA) from FY 78 through FY 83. Logistics dollars are steadily increasing and are occupying a larger percentage of our increasing TOA. This increase is a recognition of the direct contribution logistics provides to the combat capability of Air Force units. The under-funding of the readiness and sustainability accounts during the previous decade has also contributed to the increase in logistics dollars as a percent of total TOA planned for the future. Unfulfilled requirements generally remain valid and must eventually be satisfied. A one or two percent increase may appear small, but, when viewed against a 50 billion dollar TOA, a 1% equates to 500 million additional dollars—dollars which buy a lot of sustainability! The decreased logistics percent of the TOA in FY 78-80 reflects an Air Force decision made during that time to modernize our tactical fighter inventory. However, with tactical modernization well underway, the readiness and sustainability of our forces have begun receiving increased attention as reflected in the greater amount of logistics dollars programmed as a percent of Air Force TOA in FY 82 and 83.

" . . . Dollars expended for logistics items greatly improve the readiness and sustainability of our forces. . . ."

The above sounds good, but what does it mean to our men and women in the field who fly or support the daily launch and recovery of aircraft or maintain the readiness of missiles? It means for aircrews, more realistic training, more sorties, better scheduling effectiveness, more capable aircraft, full WRM kits, and more training munitions to name just a few. For maintenance people, it means more filled requisitions from supply, more available bench stocks, less cannibalizations, and more aircraft/missiles/vehicles in commission and available for operational use. In short, dollars expended for logistics items greatly improve the readiness and sustainability of our forces and make a logistician's job easier. Money, though not a panacea for all the difficulties inherent in Air Force logistics, will certainly

improve our ability to accomplish our jobs while simultaneously improving Air Force combat capability—making us more effective and more efficient.

The role of the programmer in the Directorate of Logistics Plans and Programs, then, is to improve the capability of the Air Force by providing the logistics resources necessary to insure our forces are both *ready* and *sustainable*. These are the bywords of the planners and programmers within Air Force Logistics Plans and Programs. The job they do in validating command requirements, developing a solid, defensible program, "selling" their program through the review process, and managing their prior year programs determines in large measure how well our units are prepared. It is a big job and certainly not one which can be "taken for granted." It is also a job that requires the right people, because in the final analysis, it is people, not planning and programming systems or computers, that sustain and maintain Air Force combat capability.

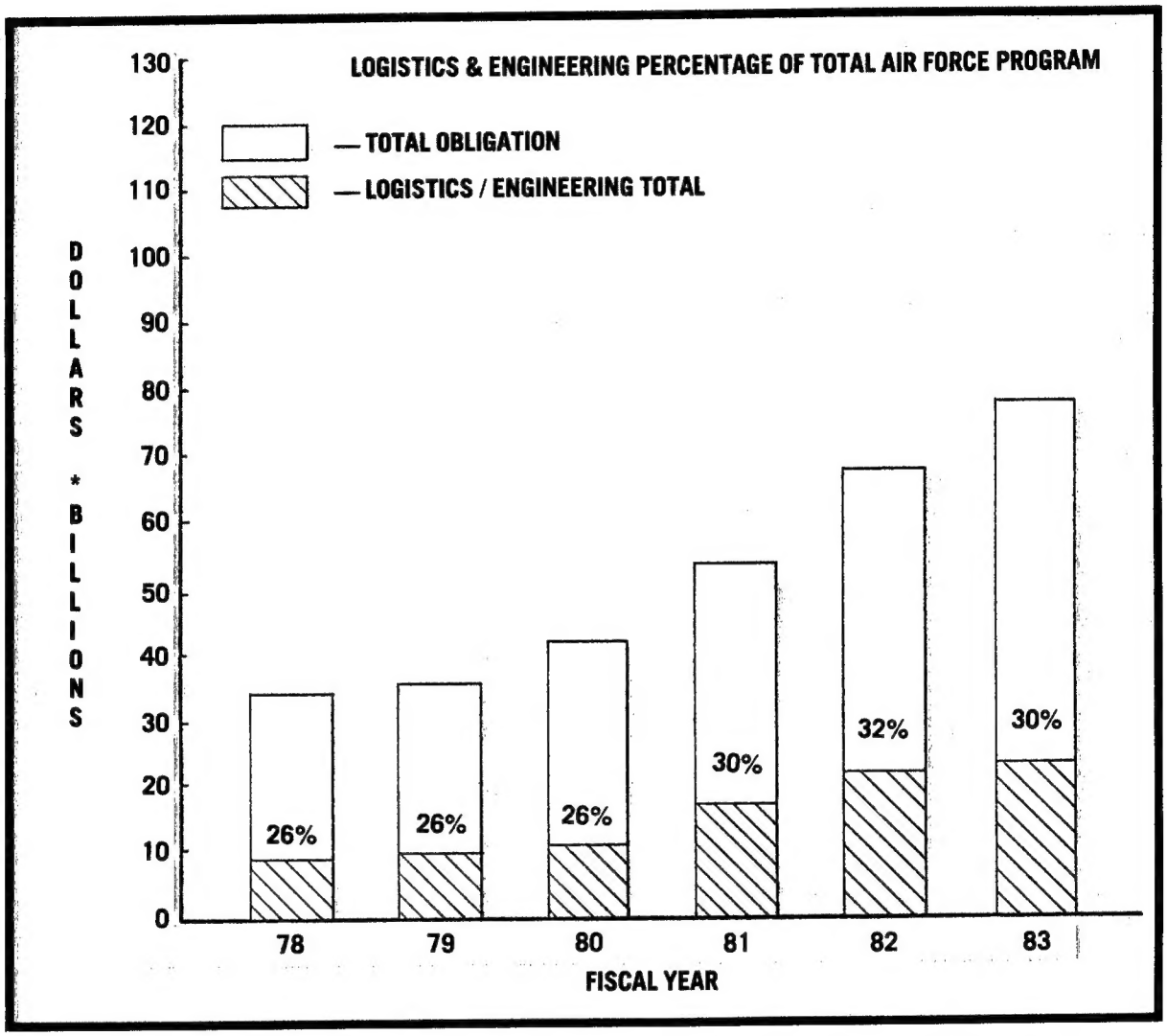

Figure 1.

ERRATUM: **An "Item of Interest" appearing on page 24 of our Fall issue (Vol V, No 4) used an incorrect number for a DTIC document. The correct number for procurement purposes is AD-100655, Compendium of Authenticated Logistics Terms and Definitions.**

Force Deployment and Sustainment: A Bold New Approach

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In recent months there has been a major new effort to enhance our ability to deploy and sustain forces. This effort focuses on the procedural and organizational framework used to perform contingency mobility planning and deployment. The complex, bureaucratic nature of the "Defense Deployment Community" has been recognized since World War II[1], and drew Congressional attention during the Fiscal Year 1981 Appropriations process. In December 1980, Congress directed the Secretary of Defense to submit by 1 May 1981, a plan for centralizing defense transportation by creating a unified military traffc management agency or command. The Office of the Secretary of Defense (OSD) accordingly directed the Joint Chiefs of Staff (JCS) to comment on this Congressional requirement. The JCS responded that there were larger issues in deployment and traffic management than organizational duplication, and suggested that existing organizations such as the two-year old Joint Deployment Agency (JDA) could potentially improve wartime transportation management and coordination. Consequently, OSD directed the JCS to form a joint service special task force (STF) to develop ways to strengthen the JDA and to develop the organizational framework that would allow military transportation resources to transition smoothly from peacetime to wartime.

[1]For a comprehensive review of defense transportation since World War II, including organizational names, structures, and authorities, see "Defense Transportation Organization: Strategic Mobility in Changing Times" by Lt Col Marshall E. Daniel, Jr., USAF. National Defense University Research Directorate, Washington DC, May 1979.

The purpose of this article then is to summarize the conclusions and the recommendations of that joint service STF. I will first describe the concept for strengthening the JDA. Second, I will discuss a recommendation for reorganizing the Transportation Operating Agencies (TOAs) to improve wartime responsiveness.[2]

To address its specific tasks, the STF first defined the framework in which it would conduct the analysis. The STF viewed the entire end-to-end deployment system from the viewpoint of the JCS and the combatant theater Commanders-in-Chief (CINCs). The problem was to improve the wartime capability of the deployment community to effectively serve the National Command Authorities (NCA), the JCS, and most importantly, the CINC, who is ultimately responsible for fighting the war. The deployment community can be graphically depicted as in Figure 1. Previous examinations of deployment issues such as the Hoover Commissions of 1949 and 1953, and the Defense Blue Ribbon Defense Panel of 1970, had focused on peacetime efficiency and cost effectiveness, and had given little regard to wartime responsiveness or to the requirements of the CINC. This shift in focus from peacetime efficiency to CINCs' wartime requirements is one of the major contributions of the STF, and distinguishes this examination from countless studies of the past.

[2]There are three TOAs: the Air Force's Military Airlift Command (MAC), the Army's Military Traffic Management Command (MTMC), and the Navy's Military Sealift Command (MSC).

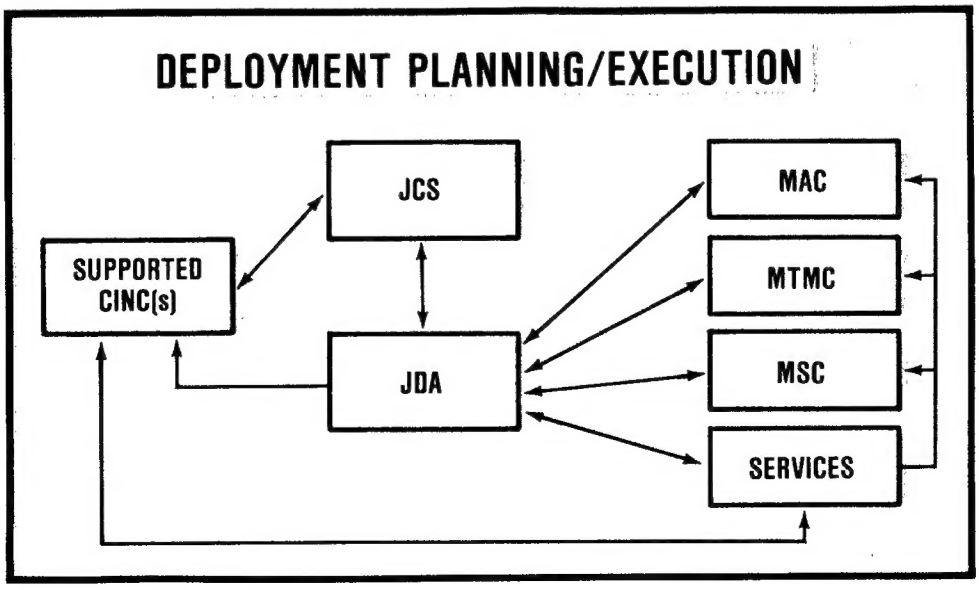


Figure 1

Joint Deployment Agency

Consistent with this new direction, the STF first determined the needs of the CINCs. The STF did this by message queries to the CINCs themselves. A summary of the questions and responses is in Table 1.

The CINCs showed remarkable similarity in their responses. The CINCs believed it imperative that the deployment planning and execution system be a single system; for only in that way could the system be effective and responsive.

As components of that single system, the TOAs should be directly subordinate/reportable to one agency. The CINCS agreed this agency could potentially be the JDA. However, before it could become the focus for deployment planning and decision-making, the CINCs said the JDA needed strengthened authority and control over a fully integrated information management system.

The CINCs were critical of the non-unit personnel, resupply, and sustainability processes. They saw little value in notional resupply requirements and overtasked lift resources. They also noted the total lack of coordination between the military standard systems (e.g., MILSTRIP, MILSTAMP) and the Joint Operation Planning System (JOPS), which precludes any link between actual resupply requirements and existing capabilities. The CINCs were concerned about the adverse impact on combat capability created by competition for lift between deploying forces and resupply. They recommended several specific improvements to the current deployment planning and execution system:

a. Use standard procedures and automatic data processing (ADP) systems in peacetime and wartime. These should link supported CINCs, supporting commands, TOAs, Service logistics agencies, JCS, JDA, etc.

b. Exercise real war plans to familiarize operators with on-the-shelf plans.

c. Combine JOPS and Joint Deployment System (JDS) software systems for plans development, plans maintenance, execution planning, and operation order execution.

d. Develop with TOAs the capability to rapidly reflow movement schedules to allow the CINCs to adjust arrival coordination and forward movement.

e. Improve communications reliability and guarantee redundancy.

f. Get the capability in JDS to selectively transfer complete files and records to different commands. Administration must be flexible enough to retrieve and aggregate unit movement data to support all levels of management.

In addition the STF also examined JDA views to determine where the JDA thought they could make a more significant

Table 1

QUESTION

REQUEST VIEWS ON CHANGES, ADDITIONS OR DELETIONS TO PRESENT POLICIES, AUTHORITIES, ORGANIZATIONAL STRUCTURES/RELATIONSHIPS AND FUNCTIONS BETWEEN YOU, TOAs, JDA, DLA, AND VARIOUS SUPPORTING COMMANDERS.

RESPONSES

- A SINGLE ORGANIZATION SHOULD HAVE AUTHORITY OVER TOAs TO INSURE EFFECTIVE MOVEMENT, AND SHOULD HAVE READY ACCESS TO HIGHEST MILITARY AUTHORITY (CINCEUR)
- WARTIME PHILOSOPHY SHOULD DRIVE PEACETIME PHILOSOPHY (CINCPAC)
- JOINT MOVEMENTS CONTROL ORGANIZATION SHOULD ACT FOR CINC (CINCPAC)
- JDA SHOULD BE FOCAL POINT FOR JCS DEPLOYMENT PLANNING, AND SHOULD SCHEDULE OVERALL DEPLOYMENT PLANNING, DIRECT DEPLOYMENTS IAW CINC/JCS GUIDANCE, AND SPECIFY REPORTABLE DEPLOYMENT INFORMATION (CINCRED)

QUESTION

- ARE THERE PLANNING AND PROCEDURAL ADJUSTMENTS THAT WOULD IMPROVE THE NON-UNIT PERSONNEL, RESUPPLY AND SUSTAINABILITY PROCESS?
- WHAT PROBLEMS EXIST WITH MIL STANDARD SYSTEMS (MILSTAMP/MILSTRIP) WHICH WOULD HAMPER DEPLOYMENT/RESUPPLY EFFORTS?

RESPONSES

- VALUE OF NOTIONAL RESUPPLY/FILLER PERSONNEL IS QUESTIONABLE (CINCLANT)
- STF SHOULD EVALUATE SYSTEM INTERFACE BETWEEN MILITARY STANDARD SYSTEMS AND JOPS/JDS (CINCLANT)
- NO DIRECT LINKS BETWEEN NOTIONAL/ACTUAL RESUPPLY (CINCEUR)
- JDA SHOULD TRACK CRITICAL RESUPPLY (CINCEUR)
- LOGISTICS AGENCIES MUST CONVERT NOTIONAL ESTIMATES TO ACTUAL LIFT REQUIREMENTS (CINCPAC)
- MILITARY STANDARD SYSTEMS PROCEDURES MUST BE INTEGRATED WITH CINC DEPLOYMENT REQUIREMENTS (CINCPAC)
- CINC SHOULD DETERMINE REQUIREMENTS; SERVICES AND TOAs SHOULD DO ACTUAL PLANNING (CINCSO)

QUESTION

WHAT ARE ESSENTIAL ELEMENTS OF AN EFFECTIVE AND RESPONSIVE DEPLOYMENT PLANNING AND EXECUTION SYSTEM FROM YOUR PERSPECTIVE?

RESPONSES

- A DEPLOYMENT SYSTEM SHOULD BE A SINGLE SYSTEM CAPABLE OF RAPID AND EASY TRANSITION FROM PEACETIME TO CRISIS USING MINIMUM ESSENTIAL ELEMENTS OF MOVEMENT INFORMATION (CINCLANT)
- SINGLE AUTHORITY SHOULD BE ABLE TO COMMIT AND PRIORITIZE LIFT BASED ON CINC REQUIREMENT AND JCS DIRECTION (CINCEUR)
- SYSTEM SHOULD PRIORITIZE LIFT (CINCPAC)
- SYSTEM SHOULD USE UNIFORM PLANNING FACTORS, COMPATIBLE SYSTEMS, MONITOR EXECUTION/MOVEMENTS (CINCPAC)
- SHOULD PROVIDE RAPID DECISION-MAKING CAPABILITY (CINCRED)
- SHOULD EMPHASIZE NO-PLAN ACTIVITIES (CINCRED)
- CINC SHOULD HAVE AUTHORITY FOR CONFLICT RESOLUTION AND RESOURCE ALLOCATION (CINCSO)

QUESTION

WHAT IMPROVEMENTS WOULD YOU RECOMMEND TO THE CURRENT PLANNING/EXECUTION SYSTEM INVOLVED WITH DEPLOYMENT?

RESPONSES

- SAME SOFTWARE SHOULD OPERATE FOR PLAN DEVELOPMENT, PLAN MAINTENANCE, AND EXECUTION MONITORING (CINCEUR)
- REFLOW CAPABILITY REQUIRED (CINCEUR)
- USE ACTUAL DATA VICE NOTIONAL (CINCPAC)
- USE CURRENT TRANSPORTATION AVAILABILITY VICE JSCP (CINCPAC)
- ENFORCE POLICY THAT OPLANs BE CAPABLE OF EXECUTION (CINCPAC)

contribution. The JDA had several specific recommendations, since they believed they did not possess authority commensurate with their responsibilities. Specifically, the JDA wanted increased authority in four areas. *First,* they wanted to play a larger role in scheduling overall deployment community efforts involving plan development. *Second,* they requested authority to specify JDS ADP requirements to the other supporting agencies within the deployment community. *Third,* they wanted the authority to direct the deployment in wartime, where it would be responsive to JCS and CINC guidance. Such authority enables the JDA to provide to the deployment community overall visibility of the entire deployment. The JDA then views the movement of all cargo and passengers in all transportation modes through all ports of embarkation (POE) and debarkation (POD). This ability to oversee then led to the *fourth* area of increased authority. By combining overall system visibility with the authority to change transportation modes; eg, air to sea, or to change POEs and PODs, the JDA can optimize lift resources, alleviate movement shortfalls, and expedite the development and revision of movement schedules.

The strikingly similar views of the CINCs and the JDA were further reinforced by the TOAs. All three TOAs believed they should respond to some sort of central direction. MAC had been named a Specified Command reportable directly to the JCS in 1977. This was to increase the overall responsiveness of airlift, a condition which would be key to the first few days of conflict. On the other hand, MTMC and MSC remained major commands of their respective services, and thus technically outside the combatant chain of command. MTMC and MSC realized that a shortfall in all modes of lift was worsening as global challenges increased, and therefore they recognized that they too should be responsive to the JCS. Putting the JDA, as an executive agent of the JCS, in a position to direct the deployment clearly presented all TOAs with a viable solution.

The Task Force's first and most fundamental conclusion underlying all others was that the needs of the CINCs and JCS in crisis, contingency, or wartime should drive the development of policies, organizational framework, and procedures in the planning and execution processes. The JDA is best able to translate JCS force allocations into deployment directions; it becomes the single focal point for deployment data. As such, it marshals critical data for the JCS and CINCs, and provides timely information to the rest of the deployment community as well. This information can be framed in such a way to respond directly to the varied needs of decision makers. The JDA must have a principal role in the development of the JDS and the coordination requirements of other ADP systems to provide an integrated deployment support information system. Moreover, the communications supporting the information systems must be dependable, reliable, survivable, and redundant.

A second conclusion showed that planning for force deployment must be more flexible. The challenges of a no-plan or a multi-plan situation dictate that force lists and deployment schedules be developed on a real-time basis. Individual force packages, which could include, for example, a major force unit, its combat support and combat service support elements, and sustainability requirements, may provide a logical approach.

The JCS schedules operation plan development, refinement, and maintenance. Additionally, they schedule joint exercises. Considering the pivotal role of the JDS in deployment execution, the STF believed an increased role in planning was indeed appropriate. The operation plan and exercise schedules should be viewed as complementing each other to avoid unnecessary diffusion of planning efforts.

In sum, the STF believed the overall US deployment capability could be enhanced though increased authority for the JDA during three phases of the joint planning and execution process: peacetime deliberate planning, time-sensitive execution planning, and deployment execution and sustainment. Specific recommendations for strengthening the JDA during those phases are listed in Table 2.

Table 2

JDA ROLE IN PEACETIME DELIBERATE PLANNING

- COORDINATE JCS, CINC, TOA, AND SERVICE ACTIVITIES RELATING TO PLAN DEVELOPMENT, REFINEMENT, MAINTENANCE, DEPLOYMENT EXERCISES, AND ESTABLISHMENT OF WARTIME INTERFACES AND PROCEDURES
- SPECIFY JDS INFORMATION AND INTERFACE REQUIREMENTS
- ASSIST JCS IN DEVELOPING INFORMATION REQUIREMENTS FOR WARTIME DECISION-MAKING AND FORMULATION OF ALTERNATIVES
- PLAY A MAJOR ROLE IN DEVELOPING OPLAN AND EXERCISE SCHEDULES
- PARTICIPATE IN PLANNING PROCESS REVISIONS TO ENHANCE EXECUTION CAPABILITY

Table 2 (continued)

JDA ROLE IN TIME-SENSITIVE EXECUTION PLANNING

- COORDINATE EXECUTION PLANNING IN NO-PLAN/MULTI-PLAN SITUATION IAW JCS GUIDANCE
- PROVIDE DATA FOR JCS USE IN EVALUATING ALTERNATIVES FOR NCA DECISION AND IN FORMULATING LIFT AND OTHER ALLOCATION DECISIONS
- PROVIDE CLOSURE ESTIMATES AND OTHER DATA FOR CINCs TO DEVELOP ALTERNATIVES AND OPTIMUM FLOW OF FORCES INTO THE THEATER
- INTERACT WITH JCS, CINCs, TOAs, AND SERVICES IN EXECUTION PLANNING
- SINGLE POINT OF CONTACT FOR OTHER SUPPORTING AGENCIES

JDA ROLE IN DEPLOYMENT EXECUTION AND SUSTAINMENT

- ACT AS AGENT OF JCS/CINCS IN ADJUSTING MOVEMENT PLANS, SCHEDULES AND MODES, AND IN DIRECTING IMPLEMENTATION OF DEPLOYMENT DECISIONS WITHIN JCS/CINC GUIDANCE
- PROVIDE DATA TO JCS FOR FORMULATING RECOMMENDATIONS TO NCA REVISING ALLOCATIONS AND ADJUDICATING CONFLICTING REQUIREMENTS
- MONITOR THE DEPLOYMENT AND PROVIDE MOVEMENT STATUS FOR THE JCS AND JOINT DEPLOYMENT COMMUNITY
- CONTINUE TO INTERACT WITH JCS/CINCs/TOAs/SERVICES, PROVIDING SINGLE POINT OF CONTACT

Transportation Operating Agencies

During the review of the total deployment planning and execution system, the STF examined the capabilities of MAC, MTMC, and MSC to transition from peace to war and to support wartime deployments and resupply requirements. This examination consisted of detailed discussions with senior people in the TOAs and JDA, probing their functions, responsibilities, and interfaces with the organizations in Figure 1. Additionally, the CINCs answered specific STF questions regarding coordination with the TOAs. Functionally and organizationally, the three TOAs had been structured to control specific segments of the transportation system. However, operational unit movements and resupply are dependent upon only two strategic transportation modes—air and surface. It is in this context that the transition from peace to war was examined. To reiterate, this wartime perspective completely distinguishes the STF examination from past studies which focused on peacetime efficiency. My discussion will first examine the air transportation structure and then will look at the surface transportation structure. Figure 2 graphically portrays the steps involved in shipping war materials in the same air and surface systems.

The airlift system is controlled and operated by MAC, a Specified Command reportable to the Secretary of Defense through the JCS. MAC uses a systems concept that is based on wartime requirements and provides the necessary visibility and control for all movements from the aerial port of embarkation (APOE) to the aerial port of debarkation (APOD). Organizationally and functionally, the required operational interfaces are in place and the necessary information base and flow exist to effect timely decision making. MAC's FLOGEN III is currently the only TOA software system that interfaces directly with the JDS to provide a limited reflow capability. Figure 2 shows that MAC performs all functions of the airlift system.

In contrast to the airlift system, management of surface transportation is fragmented between MTMC and MSC. A completely integrated surface transportation system does not exist. Figure 2 shows that surface movement is more complicated than air movement. At the risk of becoming unnecessarily detailed, an overview of surface transportation follows.

The movement process is initiated by a shipment offer and routine request which are transmitted to the MTMC area command where routing and sea port of embarkation (SPOE) are recommended. The process is different for container and breakbulk movements (cargo that cannot be packed in containers, e.g., most wheeled or tracked vehicles). For container movements, MTMC provides the necessary information to MSC for booking with an ocean carrier. Once booked by MSC, that information is provided to MTMC. MTMC provides the shipper with the designated carrier and SPOE. The shipper then releases the material to the designated carrier. Containers move under the MSC container agreement via commercial ports and ships. The ship manifest is prepared by MTMC based on the shipper's

documentation and forwarded to the commercial carrier and overseas consignee.

Breakbulk cargo is offered to and routed by MTMC to the military ocean terminals. MTMC either consolidates shipments for containerization, in which case movement will be as previously described, or offers it as breakbulk shipment to MSC for movement on a commercial or MSC-controlled vessel. MSC schedules a vessel, while MTMC provides terminal handling and prepares and forwards documentation.

The terminal operating function of MTMC and the sealift operation of MSC are industrially funded. Separate bills are prepared by each and forwarded to the shipper's military service.

MSC and MTMC have each developed ADP systems for managing specific segments of the movement process. Each system is at a different stage of development with future enhancement programmed. Neither command will have a reflow capability before FY 1983. The MSC Integrated Management Information System (IMIS) is scheduled for completion in FY 1987. MTMC's present system is programmed for refinements through FY 1987.

When viewed as a functional system for planning and moving cargo from origin to destination in wartime, it is clear this system contains numerous interactions and complications which are neither necessary nor desirable. The system is based on peacetime operations and is driven by economic rather than wartime considerations. The management fragmentation raises serious concern for our capability to transition to a wartime posture and provide effective wartime surface transportation.

The STF concluded that integrated management could provide the necessary direction to best operate a total surface movement system capable of smoothly transitioning to war and ensuring the continuous flow of cargo. The STF recommended fully integrating MTMC and MSC into a unified surface transportation command reportable to the Secretary of Defense through the JCS.

On 24 July 1981, the Joint Chiefs of Staff approved both major STF recommendations, and forwarded their approval to the Secretary of Defense. Deputy Secretary Carlucci approved them on 16 September, and directed the STF to plan for their implementation. This decision was not heralded on the evening news, nor was it debated on the pages of the Washington Post. But the fact remains that when the JDA becomes fully capable of directing and monitoring a deployment community supported by parallel airlift and surfacelift systems, the CINCs' warfighting capability will be immeasurably improved. When the JDA, as the single agent of JCS, possesses visibility over all military wartime transportation, and when all interested command and agencies can extract necessary management information from a single ADP system, force deployment and sustainment will become responsive and effective.

The deployment planning and execution system must undergo revolution, not evolution. The changes discussed in this paper are key to enhancing U.S. warfighting capability. In the past, reorganization has been resisted. To some extent the reasons might have been valid, because defense transportation needs over the years have continued to be met. However, the inability to deploy forces rapidly, as highlighted in Exercises Nifty Nugget and Proud Spirit, supported by factors such as the increasing Soviet threat, the worsening strategic lift shortfall, and the dominance of intermodalism, compel this revolution to begin now. I do not intend to ignore the difficulty of the decisions that must be made, but many difficult ones have already been made. Our leaders must re-emphasize the growing realization that strategic mobility, when properly organized and administered, is very much a "weapon system" like ships, missiles, and bombers, and can critically affect overall national security posture. The bold new steps described in this article clearly demonstrate a willingness by senior leaders to break out of a pattern of incrementalism and to undertake organizational initiatives which could radically improve our ability to get the job done. Professionally we can do no less, in fact all of us who know the system must continue to evaluate and then re-evaluate its performance under simulated wartime stress.

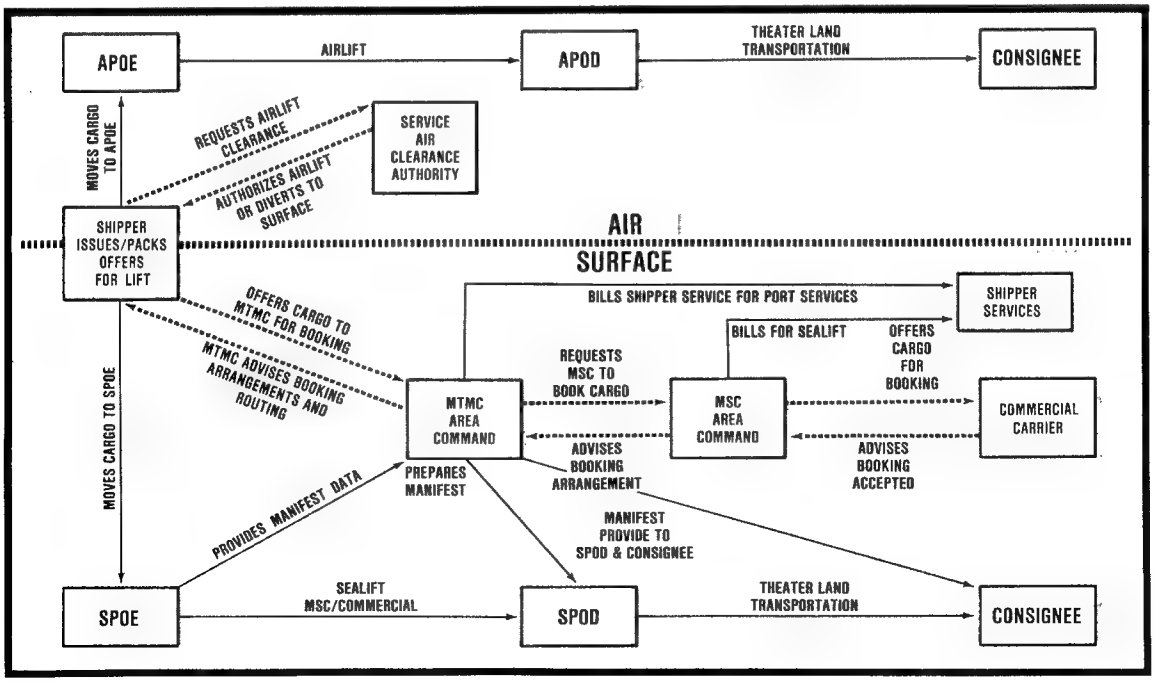
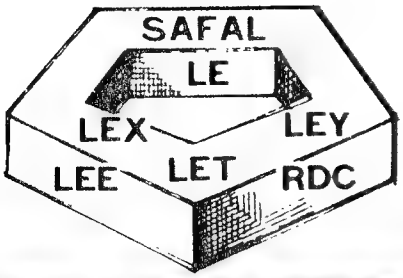


Figure 2



USAF LOGISTICS POLICY INSIGHT

Stock Fund Role Enlarged

The Secretary of Defense has directed that the military services program dollars in the President's Budget for building of stock fund peacetime inventories to support force modernization, equipment modifications, and sustainability initiatives. Prior to this policy change, the only appropriated funds used by the Air Force stock fund were for war reserve materiel (WRM). All peacetime inventories were funded by regular stock fund obligation authority. This new policy will take effect in FY 83 and means that the stock fund will play a much bigger part in the Program Objective Memorandum (POM) process in future years. The Weapon Systems Program Office, AF/LEXW, is the OPR for this program.

Baseline Support Objectives Directed

Policy guidance has been issued by message directing the use of predetermined support objectives for war reserve materiel (WRM) requirements. For aircraft war readiness spares kits (WRSK) and base-level self-sufficiency spares (BLSS) supporting 12 or more aircraft, a baseline of 4 aircraft not mission capable at the end of the support period per 24 supported will be used. Deviations from this baseline, plus support objectives for other WRM segments,will be approved by HQ USAF based upon joint recommendations of the supported command and the Air Force Logistics Command. The new policy will be published in AFR 400-24.

DOD Instruction 4320.4 to be Rewritten

The Air Force has taken the lead in a tri-service effort to rewrite DOD Instruction 4320.4, "Standard Method for Computation of Spare Aircraft Engine Procurement Requirements." The major changes in the new rewrite include allowing for departmental discretion in the use of standard forms and expanding the instruction from only initial acquisition to consideration of spare engine requirements throughout the weapons system life cycle. Additionally, each department will be given the ability to determine meaningful readiness and risk criteria (i.e., 80% vs. 90% confidence level).

The DODI will be coordinated with MAJCOMs and be ready for submittal to OASD by April 1982. The revised DODI will provide a more accurate method of calculating spare engine requirements. The more accurate calculations will in turn increase weapons systems operational capability if the spare engine requirements are funded.

FOSK Concept Expanded

The follow-on spares kit (FOSK) concept is being expanded to include a segment of prepositioned war reserve materiel (WRM). The quantities of peacetime stocks expected to be available at the time of deployment will be subtracted from the gross FOSK requirements to determine the prepositioned WRM objective. FOSK authorizations are automatic and mandatory for all units with wartime mobility tasking that deploy their maintenance capability in separate major increments.

Project "Service Lift" Begun

The USAF has begun procuring aircraft spare parts and support equipment under Project Service Lift to correct logistics shortfalls associated with strategic airlift. The goal of this effort is to have the strategic airlift system fully capable of meeting surge/sustained wartime utilization rates as soon as possible. A joint C-5/C-141 Tiger Team with members from the Air Staff, HQ AFLC, HQ MAC, and appropriate air logistics centers has been established to implement the effort.

DOD Mobility Shelters to be Acquired

In an effort designed to provide additional mobility for tactical fighter systems, HQ USAF/LEYY is implementing a program to acquire DOD standard mobility shelters and to integrate into them the avionics intermediate shops (AIS) which support our first-line tactical fighter systems. Units equipped with these shelters will be able to deploy their immediate-level avionics repair capability into bare-base situations. The shelters to be used are from the DOD standard family of shelters which are managed and acquired by the Naval Air Systems Command (NAVAIR); for this reason, they are referred to as NAVAIR shelters. This program will apply to the F-15, F-16, A-10, and F/EF-111 systems.

"Small Purchase" Ceiling Raised

The 97th Congress authorized the Department of Defense to use simplified "small purchase" procedures on contract transactions up to $25,000 (the ceiling has been $10,000). This change will result in significantly shorter acquisition lead times on a large number of purchase actions, will permit more efficient use of contracting manpower, and will allow vendors to process and deliver orders more quickly.

LASS to Replace Start Cart

The Air Staff is supporting a new initiative to replace the aging MA-1A engine start cart with a Large Aircraft Start System (LASS). The LASS will be used in conjunction with the A/M32A-86 diesel generator set to satisfy SAC's, MAC's, and AFSC's increased power and pneumatic air requirements. The system will be introduced in late FY 85, with program completion by FY 89. As the LASS and -86 generators flow into the Air Force inventory, the old MD-3 generator, M-1A start carts, and A/M32A-60 series turbine generator will be retired. Full implementation of the program will cost $157.5M; however, over a five-year period the combination of LASS and diesel generators will save $250M in fuel costs alone.

API Trophy Awarded Hickam

In a ceremony at Kelly AFB, Texas, 8 December 1981, representatives from Hickam AFB, Hawaii, accepted the American Petroleum Institute (API) Trophy for 1981. Major General Earl T. O'Loughlin, Commander SA-ALC, made the presentation at the USAF Energy Management Steering Group meeting. The API Trophy is awarded annually to the top-rated base fuels organization in the Air Force. Beale AFB, California, and McGuire AFB, New Jersey, were first and second runners-up respectively. The award was established in 1965 following donation of the rotating trophy by the American Petroleum Institute.

Getting More From DLA

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Considerable discussion and attention have recently been devoted to the logistics problems facing the military services. While much of that discussion has centered upon weapon system acquisition problems, the most immediate impact on the operational capabilities of all of the services is felt in spares shortages. At the Air Force wing and squadron levels, supply and maintenance personnel are all too aware of the impact spares shortages have recently had on weapon system availability and subsequent performance. Many of these operational difficulties are in fact attributable to the lack of consumable or economic order quantity (EOQ) parts—the small bits and pieces such as seals, fasteners, bearings, and resistors. This impact appears Air Force-wide and is not system particular. The Tactical Air Command for example recently reported that almost 50 percent of the "not fully mission capable" requisitioning hours were lost due to the lack of EOQ parts. Both the Strategic Air Command and the Air Training Command reported similar rates.

The problem faced therefore at the retail level is how, in these times of shortages, can spares support be improved? Improving support from the Defense Logistics Agency (DLA) may then be a good place to start. DLA is a primary manager of consumable items with responsibility for over half of the active EOQ items in the Federal Supply Catalog and annually fills two-thirds of all Department of Defense requisitions for stocked items. Even with this tremendous impact across the services, the DLA operations and support functions have remained largely unknown or ineffectively used by the Air Force community at large. During my assignment at a DLA supply center, I daily observed a number of DLA/Air Force transactions. Consistently, message traffic and telephone conversations between Air Force supply organizations and the DLA supply centers revealed a lack of knowledge by many Air Force users of the DLA system that in turn was affecting the ability of DLA to effectively support Air Force units. Therefore, the purpose of this article is to relate some of these observations and to provide firsthand information to those who have not had the opportunity to work at DLA. Hopefully then, this article will shed some light on the structure and operation of DLA and provide some useful guidance to enable base users to obtain better DLA support.

Defense Logistics Agency

The Defense Logistics Agency, originally the Defense Supply Agency, was formed in the early 1960s to provide supply support for those items that were common to more than one service and were nonrepairable or consumable. The centralized management of those items reduced duplication of effort and capitalized on inventory and requisitioning efficiencies. DLA has now evolved into the current organization (Figure 1) which manages more than 2 million stock numbers. When probing the DLA operation, two factors must be recognized. First, DLA was not *originally*, nor is it *currently*, organized to provide for system management. The organization manages commodity groupings without regard to the impact that particular overall management decisions may have on an Air Force weapon system. DLA efforts are directed toward maintaining the best possible stock availability or fill rate while reducing the overall level of backorders. The aggregate stock availability figure is, in particular, viewed by DLA as the primary yardstick to measure the calibre of support provided to the military customers. Second, DLA is extremely important to Air Force weapon system support—an importance which will increase. Currently, the DLA system manages over 70 percent of all items—including both spares and consumables—associated with the F-16 aircraft. In addition, the DLA impact will expand due to the continual transfer of stock numbers from the various services to DLA management. More than 200,000 items will be transferred to DLA in FY82. As an expanding organization, DLA will increase its importance to Air Force users.

Of primary concern specifically to the Air Force supply community should be the DLA supply centers. These organizational units determine the management and the distribution of assets to military customers. Each of the six supply centers is functionally organized, although actual work units within the major functions are in fact organized along commodity lines (seals, bearings, cable, etc.). Air Force requisitions, messages, and telephone calls flow into these supply centers and, depending upon the stockage and purchase policies at each center, are answered to user satisfaction or in a way that may become user dissatisfaction. The policy set at each of these centers ultimately later determines the responsiveness of DLA to service requirements. A decision to change any one of a number of stockage policies may materially affect the readiness of an Air Force weapon system.

Item Management

The individual who actually carries out DLA policy and deals with you the customer is the item manager (IM). Located within the supply center supply directorate, the IM manages from one hundred to several thousand stock numbers, initiating buy requests, diversions, and other activities associated with item management and customer support. The item manager serves as the requester's focal point in the organization for any specific stock number. The decisions the IM makes and which you must later live with are based on somewhat limited information. The item manager has limited knowledge of your particular asset position or your stock level. Your requisition and any other communications you address to the IM concerning that requisition or stock number are the only pieces of external information available to him. Your input, coupled with the study center form, *Standard Supply Control Study*, provides the IM the basic information to determine the support required for the military users.

The *Standard Supply Control Study* (DLA Form 690) is a computer produced sheet that is the principal management

tool available to the item manager. Each study sheet provides detailed information about one, and only one, specific stock number. The study sheet can be produced for any number of reasons; however, it is usually initiated when the computer identifies a stock number requiring purchase actions or when the IM has become concerned about an item and requests a study sheet output from the computer. With the study sheet, your requisitions, and your messages, the item manager then determines how much to buy and which requisitions should receive priority treatment. The actual information contained in the study sheet falls into the following five areas:

1. **Basic Item Information.** Basic data such as the stock number, unit price, and service users are listed with additional management information including production and administrative lead times.
2. **Demand History.** The quantities demanded for the stock numbers are grouped by service and stratified by quarter for each of the past four quarters.
3. **Buy Recommendations.** The computer will recommend buy quantities to the item manager based on the lead times and stockage information available. The IM will review this area and adjust the computer recommendations based on such factors as changing lead times not reflected in the study sheet and message traffic from service customers indicating increased usage or priority requirements.
4. **Depot Analysis.** This area of the study sheet provides the IM the asset balances located at each of the Department of Defense depots containing DLA assets and the condition of that stock.
5. **Contract Status.** This last area of the study sheet lists the outstanding contracts, their quantities and due dates, and the purchase requests awaiting award. From this information, the IM can estimate when requisitions will be filled.

Other than the supply control study, there are some limited internal pieces of information available to the IM such as a detailed two-year transaction history. However, almost all the purchase decisions and requisition release decisions are based on the supply control study information, the requisition, and specific messages and telephone conversations made to the item manager.

Other Item Management Areas

There are a number of supply center programs designed to support DLA customers. Each program is devoted to particular user problems and, combined, there are too many to be adequately covered within this article. Three that often apply to Air Force supply users are the Emergency Supply Operations Center (ESOC), the weapon system support program (WSSP), and the material diversion options.

The ESOC is comparable to the base level Mission Capability (MICAP) unit. It is manned 24 hours a day and provides emergency services to base level users. This unit operates in concert with the IM and releases stocks to users in coordination with the IM. In performing their service, ESOC personnel will contact other asset users to supplement lateral support when stocks are not available within DLA. However, the ESOC is concerned with priority requisitions and only controls a requisition until the material is released against it, or when the request is downgraded.

The WSSP is designed to identify stock numbers of service-designated weapon systems. Once a stock number is tied to a WSSP-authorized weapon system, a weapon system code is loaded against the item record. This process can in fact assure that more stock is available for an individual stock number than might normally be allocated. Those DLA supply centers that assign variable support levels to their stock numbers generally provide higher levels for those weapon-coded items. The supply center commander is, additionally, briefed periodically on the status of each weapon system and the stock numbers associated with it, and management action at the highest levels within the supply center may be taken as a result of this review. Identification of a stock number as a weapon system related item does not guarantee asset availability when you need it or restrict the requisitions of other services. But such identification will usually provide higher support and guarantees higher management visibility.

The option to divert material from the contractor directly to the customer rests with the item manager. When DLA does not have an urgently needed item on the shelf, customers frequently ask for diversions as a speedy means for gaining assets. A diversion occurs when the supply center tells the contractor to ship a portion of the center's order directly to a specified user. At issue here then, is whether the customer in fact gets the assets any quicker. While no figures exist, a number of factors determine the effectiveness of such a diversion. Those factors include the contractor's willingness to divert the material, the contractor's past performance, the completeness of the order, and the packaging requirements for shipment. A continuing problem with any diversion is that, once passed to the contractor, the item manager loses all visibility of the assets. A possibly quicker and more effective approach would be to initiate a priority requisition from the base to DLA requesting a priority direct delivery buy. The supply center and the contractor can then respond much easier to this type of transaction, and you are likely to get your assets sooner.

Defense Logistics Agency/Air Force Interfaces

The interface between Air Force users and the supply center organization has highlighted a lack of understanding on both sides. Air Force users tend to view DLA supply centers as extensions of the Air Force Logistics Command (AFLC) and expect the item managers to conform to standard Air Force operations and procedures. DLA, on the other hand, operates for the benefit of all military services and does not readily accept or react to single service idiosyncracies. Since it seems highly unlikely that DLA will change this view, it falls on all Air Force users to understand the interface between the user and the item manager and then use this understanding to obtain the best available support from DLA.

Requisition Follow-Ups

The first thing to keep in mind is that the item manager has different priorities from yours. The supply center, in general, and the item manager, in particular, are in the middle between you and the contractor. While the item manager is concerned with overall performance of all stock numbers assigned, there are only limited options available when there is no stock. There is not a DLA repair facility from which to generate consumables. The IM can opt to either contract for more stock to fulfill your requisition or attempt to expedite contracts already underway.

To take either course of action, the IM must deal with a variety of people in other functions in an attempt to get the necessary work performed to obtain the stocks and release your requisition. To do so requires a clear understanding, on the part of the IM, of what the continued lack of stock does to your weapon system, production line, or project. Message traffic citing technical orders or filled with supply acronyms such as NMCS, PMCS, DIFM, and AWP is not terribly helpful to the item manager. The item manager possesses no

technical orders, nor is this individual usually conversant in Air Force supply terminology. Messages should reflect clearly and in lay terms what it is you want and the consequences of not getting it. Stating, for example, that the lack of a particular spare is grounding a wing of F-15 aircraft will be quite meaningful to the item manager and any other individuals within the supply center, and such a message will likely get much more action than one citing NMCS or PMCS conditions.

A final comment on follow-up correspondence sent to DLA. DLA has its own hierarchy of message urgency based on certain key phrases. For example, use the standard format in AFM 67-1, Vol I, Part I, Chapter 1 first, using plain language. Watch out for AF peculiar terminology. For example, the term "supply difficulty," interestingly enough, is meaningless to DLA and not mentioned in any of their regulations. "Supply assistance," however, does require certain levels of effort by DLA supply centers. Current DLA regulations specifically require an intensive effort toward supply assistance requests from the services. The supply difficulty messages will usually receive attention after the supply assistance messages. A message citing "command interest" gets top level involvement and obviously the most intensive management. This last category of message should be used only for the most serious of spares problems.

Forecasting Requirements

The best course of action is to avoid any out-of-stock conditions. While it is not entirely under your control to ensure that DLA has maintained adequate stocks, the Air Force users still have inputs into the system. The identification of weapon system related stock numbers does provide for potentially more assets and a greater degree of management attention. One of the greatest single causes of backorders within the supply center, however, is the unanticipated demand surge. These surges will quickly drain stocks and create support problems for all users. Once the stocks have been drained, there is little to do but wait for a catch-up in production. The significance of the problem was highlighted by one supply center when it discovered that fully one-third of its backorders were due to unexpected demand surges.

Air Force users can provide a valuable input to DLA, which should help to reduce the problem. When base or even depot level users identify possible requirements for future periods, the DLA supply center responsible for item management should be informed. This is not an easy task or one that can be accomplished for all cases at all times. However, large scale maintenance actions or changes in production lines usually require substantial numbers of consumables to complete the required actions. To make sure that you have such items on hand, some effort must be expended to identify your consumable requirements and then to convey that information to the DLA supply center. An excellent method of relaying these additional requirements to DLA is by the Special Program Requirements (SPR) process, which is described in AFM 67-1, Volume I, Part I, Section W. This program allows DLA to learn of unusual requirements which they cannot anticipate based on past demands, and provides them with the necessary data to effectively support your increased or unusual requirement. The SPR card can be initiated at either the base or depot and will result in DLA procuring the materiel ahead of time and in most cases have it available for requisitioning by your support date. This process requires a Demand Code "P" to be in the requisition to differentiate between a requirement that has not been forecasted to DLA and the SPR. Use of this method does not commit your funds until the funded requisition is submitted to the DSC, even though DLA may take action to have the assets available. The idea is to let the supply center know of a possible demand surge. Even a telephone call or message stating that certain demands are projected beginning on a specified date will be very helpful to the item managers. While the supply center may not be able to take purchase action immediately, the IM will be able to initiate actions to expedite existing contracts and to make contingency plans. The forwarding of this information to DLA will help to avoid serious outage problems later.

Do's and Do Not's

I have, to this point, broadly discussed DLA operations and structure. The major thrust of this article—how to get better support out of DLA—and all of the discussion to this point can be synopsized into the following five *Do's* and *Do Not's:*

- *DO NOT use acronyms or supply jargon in message or telephone traffic with the item manager. Simple, clear English will do a much more effective job of conveying your point.*
- *DO NOT send supply difficulty messages to DLA. They are meaningless. Use either the term* "supply assistance" *for important messages or* "command interest" *for critical messages.*
- *DO NOT demand diversions as a matter of policy to obtain stocks quickly. The effectiveness of diversions is questionable, and both the supply center and the contractor are usually better organized to handle a priority direct delivery requisition.*
- *DO identify stock numbers to weapon systems for improved stockage and management. While this will not guarantee support to your activity, the stock number will be better maintained.*
- *DO project anticipated demand surges. You may not usually know when a demand surge will take place, but when you do, notify the supply center. SPR cards are an excellent means of forecasting requirements, but a message or telephone call will also enable the item manager to take action to meet these future obligations and, ultimately, reduce Air Force supply problems.*

Conclusion

The Defense Logistics Agency is a large and highly complex organization established to support all of the military services. It already contributes significantly to Air Force readiness—and that impact will likely increase. DLA possesses both the funding and the management to fully support Air Force requirements. To take full advantage of the services offered by DLA, Air Force users must understand the organizational operations and programs as well as improve the communications/interface between DLA and users.

In this article, I have pointed out some of the simple things that can be done by base users to improve their lot with DLA. How well DLA continues to support Air Force needs rests in many cases on the ability of Air Force users to work with the DLA supply center and its managers. Using the DLA programs and communications techniques described in this article, Air Force users should obtain better DLA management of Air Force requirements and, ultimately, better support for Air Force users.

Resources Allocation—The F-100 Engine Experience

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Abstract

In April 1979, Pratt and Whitney Aircraft Group, manufacturer of the F100 engine, notified the Air Force of labor strikes at two of its key vendors. Continuing into September 1979, these strikes were particularly alarming to the Air Force, since both vendors were sole suppliers of several critical F100 parts to Pratt and Whitney. There was growing concern that the impact of the strikes could seriously affect the national defense posture since the F100 engine powers the F-15 and F-16 fighters. To cope with the anticipated shortfalls, the Air Force organized the F100 Engine Strike Recovery Team, an intercommand/contractor group, to manage the impact of the strikes. This article describes the team and its efforts to achieve an optimal Air Force solution to the F100 situation by balancing the needs of field readiness and new aircraft production.

The availability of material resources in all forms—raw stock to bit and piece parts—is a key concern in logistics and acquisition circles. Funding constraints, long lead times, escalating costs, and changing requirements make decisions on what to buy and how to allocate resources critical factors in supporting repair and production lines in the field.

On 19 April 1979, Pratt and Whitney Aircraft Group (PWAG), manufacturer of the F100 engine, notified the F100 contracting office at the Aeronautical Systems Division of a labor strike at one of its major forging vendors on 11 April. It also reported that the supply of material on hand or in process would support spares and engine requirements for a minimum period of 60 days. On 30 April, Pratt and Whitney sent a second notice announcing a labor dispute at one of its key bearing vendors and describing the impact of the dispute for the next month.

". . . strikes would pose a serious threat to F100 production."

Notification of these strikes was particularly alarming to the Air Force since both vendors were sole suppliers of several critical parts to Pratt and Whitney. The forging house supplied 15 forgings for the engine, but alternate sources were available for concurrent deliveries of only three of the 15. The remaining 12 forgings had second sources coming on line between May and November 1980. The bearing house supplied two accessory bearings and three main shaft bearings; second sources were available for concurrent deliveries of only two of the five bearings. Although Pratt and Whitney had a qualified second source for two others, it did not expect deliveries from the source until the fourth quarter of 1980, and it was still in the process of qualifying an alternate source for the fifth bearing. Obviously, protracted strikes would pose a serious threat to F100 production.

The bearing producer remained on strike from 23 April to 23 September 1979 and the forging house from 11 April to 6 September 1979. Despite workarounds that included borrowing military assets, the flow of parts affected by the strike had dwindled to a point by June 1979 that Pratt and Whitney could no longer maintain contract schedules.

". . . Pratt and Whitney could no longer maintain contract schedules."

There was growing concern in the Air Force that the impact of the strikes could seriously affect the national defense posture since the F100 powers F-15 and F-16 fighters. At a strike status review on 25 July 1979, Pratt and Whitney predicted a shortfall of 39 domestically produced engines by the end of 1979, a maximum shortfall of 159 in June 1980, and recovery by July 1981. Obviously, aircraft production lines and field support would be severely jeopardized unless management took decisive action. Maj Gen James Abrahamson, then the F-16 System Program Director, remarked at the status review that the F100 dilemma could be solved only through "cooperation, collective judgment, and the full knowledge of available assets." This discussion describes the combined Air Force and contractor response to the F100 crisis. The approach used in resolving the crisis can be applied to other programs faced with the same underlying problem—too many demands for too few supplies.

The Engine and the Team Concept

The F100 is a low-bypass, high compression-ratio turbofan engine in the 25,000-pound thrust category, and it is produced by the Manufacturing Division of Pratt and Whitney Aircraft Group in East Hartford, Connecticut. Pratt and Whitney began design work on the engine in August 1968, and it was first flown in an F-15 Eagle at Edwards Air Force Base, California, during July 1972. In early 1975, the Air Force selected the General Dynamics YF-16, which was powered by a single F100 engine, as the companion fighter to the F-15. By the end of October 1981, Pratt and Whitney's production facility in East Hartford had produced more than 1,600 F100-PW-100 engines for F-15 application and more than 500 F100-PW-200s for use in the F-16. The latter configuration is also co-produced by a consortium of four European nations—Belgium, Norway, the Netherlands, and Denmark. A unique feature of the engine is its modular construction designed to facilitate maintenance and improve repair turnaround times in the field (2). The core, one of five modules, is the heart of the engine since it contains the compressor, burner section, and hi-pressure turbine. Its supportability in the field and at the depot is critically important to the overall support posture of the F100 program.

". . . Air Force . . . organized the F100 Engine Strike Recovery Team . . . ."

To cope with the significant shortfalls, the Air Force, on 1 August 1979, organized the F100 Engine Strike Recovery Team, an intercommand/contractor group to manage the impact of the strikes.** Members of the team included representatives from Air Force Systems Command (AFSC), Tactical Air Command (TAC), Air Force Logistics Command (AFLC), and the prime contractor, Pratt and Whitney. Representatives from three separate system program offices at the Aeronautical Systems Division—Propulsion, F-15, and F-16—had program management responsibility for their respective systems. The Air Force Plant Representative Office, also an AFSC organization, played an important role because of its daily interface with Pratt and Whitney. Headquarters Tactical Air Command, representing tactical air forces worldwide, provided insight into unit activations and issues of field supportability. Logistics concerns were handled by representatives from the San Antonio Air Logistics Center (SAALC), the location of the depot repair facility and AFLC system management for the F100. The production expertise of PWAG representatives determined whether the recovery effort would succeed or fail.

The team was organized in two tiers—a working group and an executive committee. With one exception, each tier included representatives from each of the agencies listed above. The working group included an additional AFSC member from the office for Contract Administration Services Europe to represent the co-production program. Headed by a member of the propulsion system program office, this group was responsible for consolidation of data on the worldwide availability of parts affected by the strikes and on uses for the parts. After analyzing the supply/demand situation, the team formulated allocation recommendations for presentation to the executive committee. The committee, headed by the F-16 system program director, then made the final allocation decisions. It also provided the latest policy guidance to the working group and interfaced with higher headquarters. In September 1979, the chairman of the executive committee presented the team's concepts, operating principles, and estimates regarding the impact of the strikes to Headquarters USAF. As a result of this contact, the team received the necessary autonomy to act decisively and independently throughout the recovery period.

The team's charter was to optimize use of available F100 resources in meeting numerous competing needs for the parts affected by the strikes—engines, spare modules, and spare parts. Of the five engine modules, the team was primarily concerned with the core because its output for allocation purposes was equivalent to the production of an engine. If Pratt and Whitney forecasted output of a given number of engines in a month, requirements for cores decreased that amount on a one-for-one basis. If the team allocated a part to an engine, it had to decide further on the type of engine—F-15 or F-16—and the use of the engine—aircraft production or field spare. None of the needs could be totally satisfied without creating a negative impact elsewhere. Therefore, the team strived to balance new production and field/depot needs to achieve an optimal Air Force solution to the crisis rather than simply an AFLC, AFSC, TAC, or contractor solution.

"This war room . . . became the meeting place for the working group."

**The author served as both the deputy leader and the leader of the working group on the F100 Strike Recovery Team from August 1979 until his reassignment in August 1981. He was also the chief of the F100 Engine Manufacturing/Quality Assurance Division, Deputy for Propulsion, Aeronautical Systems Division, during the same period.

The team held a number of meetings at both the working group and the executive committee levels during the early phases of the recovery. Each meeting of the executive committee was preceded by a separate session of the working group, which collected, analyzed, and arranged data for later presentation at the executive gathering. The working group met on numerous other occasions to familiarize itself with material control, purchasing, and production systems maintained by Pratt and Whitney so that it could make informed allocation recommendations based on the contractor's capabilities. One of the group's first tasks was to establish a visibility center or "war room" in East Hartford to display information that would assist in the allocation process. The display included contract schedules, the status of critical parts at San Antonio, the status of the vendors' strikes, disposition of engines and components returned to Pratt and Whitney for warranty work or overhaul and repair, and a matrix chart comparing the availability of parts affected by the strikes with engine assembly requirements. This war room, updated regularly by Pratt and Whitney, became the meeting place for the working group. Also during the initial months of the recovery period, the team collectively developed a set of allocation principles that became the cornerstone of the recovery process.

Principles of Allocation

The continuing strikes led to acute shortages of key parts. (Figure 1 shows the impact of these shortages on Pratt and Whitney's build time for assemblying and testing the F100 engine.) The contractor attempted to maintain a six-week build time; however, success meant that finished parts had to begin flowing to the assembly floor two weeks prior to the month in which the contracted number of engines was scheduled. But, as the supply of bearings and forgings diminished, the interval fell below six weeks in July 1979, quickly plummeted to three weeks, and remained at that depressed level through August of the next year.

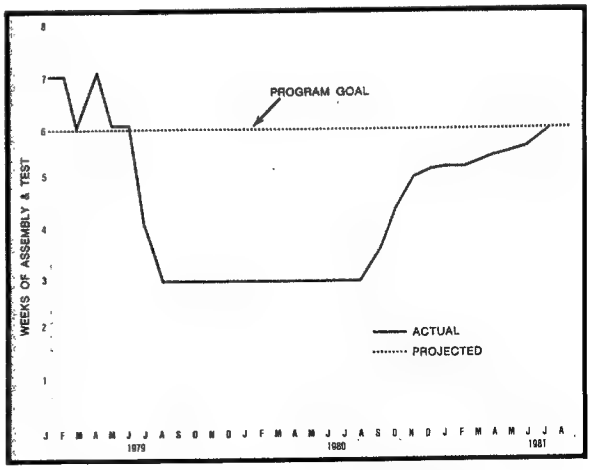


FIGURE 1: F100 ASSEMBLY & TEST BUILD TIME HISTORY

The length of the build time became an excellent barometer for addressing Pratt and Whitney's ability to recover. Longer intervals meant more timely receipt and increased availability of parts and, consequently, a higher probability that the contractor could achieve production schedules. As shown in Figure 2, shortfalls in domestic (East Hartford) engine production began in July 1979, the same month that the build time dropped below six weeks. Similarly, improvements in shortfalls during September 1980 coincided with an improvement in the build time. The outlook in August and September 1979 was bleak; the team forecasted a maximum shortfall of 193 engines and the potential of storing anywhere from 60 to more than 100 airframes. The team grappled with a number of major concerns.

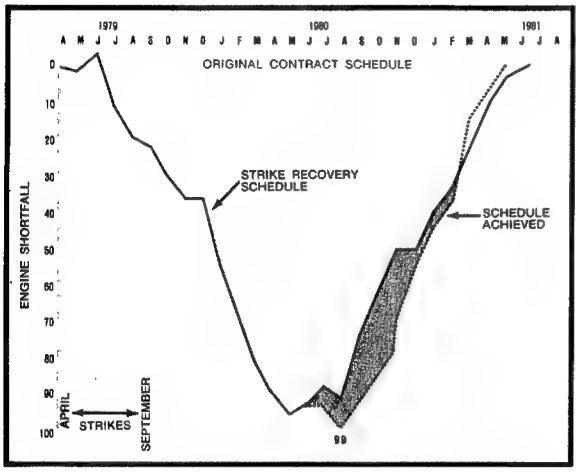


FIGURE 2: F100 DOMESTIC ENGINE PRODUCTION

The first concern was the potential impact of the shortfalls on production schedules for the F-15 and F-16 aircraft. Thus, to minimize the impact on the aircraft production lines, the team developed an "engine pooling" principle. The pool represented the minimum number of engines required at the aircraft manufacturers at any given time to maintain the flow of airframes through assembly, test, and government acceptance. For example, General Dynamics attempted to maintain a sixteen-week supply of installed and uninstalled engines to support its F-16 production schedules, but the size of the pool was based on a six-week inventory and a small maintenance factor. Theoretically, an inventory of less than the minimum pool necessitated storage of airframes. To prevent total work stoppage on the production line, the team planned to remove an engine from an aircraft already accepted by the government and reinsert it into another airframe on the production line. The status of the engine pools served as a reliable guide for determining the mix of engines, F-15 versus F-16, that would be produced at East Hartford.

Team members representing the F-15 and F-16 system program offices took extraordinary actions to avoid storage of airframes at their respective aircraft manufacturers. In negotiations with Tactical Air Command and the Warner Robins Air Logistics Center, the F-15 system program office established a program called "Have Swap," which involved the early input of 30 F-15 A and B model aircraft into an airframe modification program at Warner Robins. Forty-seven engines were released from this program to McDonnell Aircraft to supplement the F-15 engine pool. In a similar move, the F-16 system program office negotiated with Tactical Air Command to divert a number of engines originally scheduled as field spares to the production line at General Dynamics. In both instances, paybacks were carefully sequenced into the recovery schedule.

". . . production of F-15 core modules would coincide as near as possible with the original contract schedule."

The second concern was to insure adequate support to field operations. At the time, the F-15 fleet suffered from a large backlog of work on core modules. Similarly, San Antonio had accumulated a number of F-15 engines that needed extensive repairs. The team responded to these conditions with two principles. The first principle called for protection of the existing force structure with adequate spares. It specified that production of F-15 core modules would coincide as near as possible with the original contract schedule. On the other hand, the delivery of F-16 spare engines and cores was throttled back during the early phases of recovery because of that fleet's relative infancy. The second principle called for diversion of parts to a project called "Pacer Basket" to repair 30 unserviceable F-15 engines backlogged at San Antonio. For planning purposes, the repair of a "Pacer Basket" engine was equivalent to the production of a new engine at East Hartford, although Pratt and Whitney later revised the one-for-one ratio and made the commitment to produce more new engines without any impact on the repair project.

A final concern was to insure equal sharing of all aircraft recipients in the impact of the strikes. The team thus devised an "equal hurt" principle requiring customers of foreign military sales and USAF units, except training cadres, to share equally in the shortfalls. The team also recommended no new customers of foreign military or direct sales during the recovery period.

The application of the principles dramatically changed the engine recovery profile proposed by Pratt and Whitney (see Figure 3). The reason for the difference was the team's diversion of parts to spare core modules and project "Pacer Basket." Pratt and Whitney's recovery profile, on the other hand, was based on assigning first priority to engine production. Application of the principles lengthened the recovery period and increased the shortfall, but, in the process, it balanced the needs of the field and new production.

Enhanced Output and Production Priorities

The team continually sought ways to increase Pratt and Whitney's output and lessen the shortfalls. The key was increased supplies of critical semifinished and finished parts, such as forgings and high precision bearings. The team sought guidance from the body of government regulations dealing with the Defense Priority System (DPS) and Defense Material System, since one of the prime purposes of these systems is to ". . . help insure that defense programs are maintained on schedule by priority treatment for the purchase of products and materials by defense agencies, contractors, subcontractors, and their suppliers" (3:1). DPS

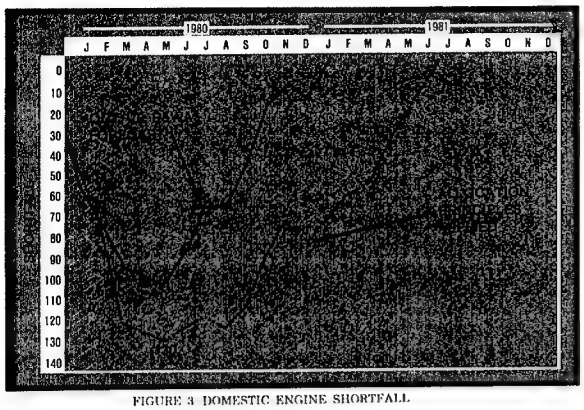


FIGURE 3. DOMESTIC ENGINE SHORTFALL

Regulation 1 covers requests for special priorities assistance to obtain this help if a situation is sufficiently urgent and if all other reasonable efforts have failed to remedy the problem. At the urging of the Air Force, Pratt and Whitney submitted special requests on the two striking vendors to insure that F100 work would receive top priority when the strikes ended. And, in mid-September 1979, the Air Force submitted a similar request on Pratt and Whitney. The requests were funneled to the Joint Aeronautical Material Activity at Wright-Patterson Air Force Base, the agency responsible for processing requests for Air Force programs. Because of the gravity of the F100 situation, the activity quickly transferred the requests to Headquarters USAF, which, in turn, requested assistance from the Office of Industrial Mobilization in the Department of Commerce. At this point, the Department of Commerce became deeply involved in the recovery process, and the Air Force served as a consultant in the ensuing dialogue between representatives of the Department and Pratt and Whitney.

". . . F100 work would receive top priority when the strikes ended."

In October 1979, Pratt and Whitney suggested that it might be able to produce additional engines in 1980 if it could obtain increased quantities of certain assets. The Department of Commerce then issued directives the following month to 10 of Pratt and Whitney's vendors to obtain the specified support (3). And, in February 1980, it issued a directive to Pratt and Whitney boosting PWAG's output for 1980 by an equivalent of 49 engines; allocation of the output was left to the discretion of the Air Force. Issuance of the directive by the Department of Commerce to Pratt and Whitney marked the beginning of the homestretch for the recovery effort, and application of the allocation principles to the enhanced schedule formed the final iteration of the recovery profile.

"The priorities . . . were similar to the principles in the sense that they blended the demands of production with field and depot needs."

The Air Force next established priorities to guide Pratt and Whitney's production decisions for the remainder of the strike recovery period. The working group formulated the priorities in February 1980, and the executive committee approved them the following month. The priorities, seven in number, were similar to the principles in the sense that they blended the demands of production with the field and depot needs. The first priority specified that parts would be diverted from Pratt and Whitney's production line to support a valid work stoppage either at the depot or in the field. The second priority supported engine component improvement and flight test programs, both of which aimed at improved engine performance. The third and fourth priorities were carryovers from the principles in requiring support first to spare cores and then to new production engines. The fifth priority called for the output of new spare engines, specifically the F-16 configuration, and repair of engines returned to Pratt and Whitney from the aircraft manufacturers. The latter concern was important because any engine in repair increased the chances of storing an airframe. The last two priorities dealt with support of two categories of spare parts. The first category was critical parts that San Antonio needed within lead times for orders but had not yet caused a work stoppage at the depot or in the field, and the second category was normal contracted spare parts.

"Increased output resulted in greater demand for parts."

The underlying assumption in establishing the priorities was that Pratt and Whitney could satisfy them without affecting the recovery schedule of engines and core modules. In the event of conflict, the Strike Recovery Team was responsible for resolving it. The team's main concern during the remainder of the recovery period was the potential impact of the first priority on the production line at East Hartford. The reasons were twofold. In the first place, the SAALC depot had experienced a steady increase in its workload. For example, the output of engines and cores stood at 26 in October 1979, 41 by October 1980, and 63 by May 1981. Increased output resulted in greater demand for parts. Another reason for concern was that the first priority could be invoked for any F100 part, not merely the 20 parts affected by the strikes and covered by the allocation principles. This fact alone increased the likelihood of an adverse impact on the production line at East Hartford. Fortunately, these problems never arose because of the close cooperation between the San Antonio Air Logistics Center and Pratt and Whitney. The contractor was able to satisfy the increasing workload requirements at the San Antonio depot throughout the recovery period.

With the exception of a shortfall caused by two separate technical problems, the homestretch to recovery was comparatively smooth (see Figure 2). The engine shortfalls were fully recovered in May 1981, a full month ahead of initial predictions. Although the maximum shortfall was 99 engines in August 1980, the team avoided storage of airframes at General Dynamics and McDonnell Aircraft through the engine pool concept, the F-15 "Have Swap"

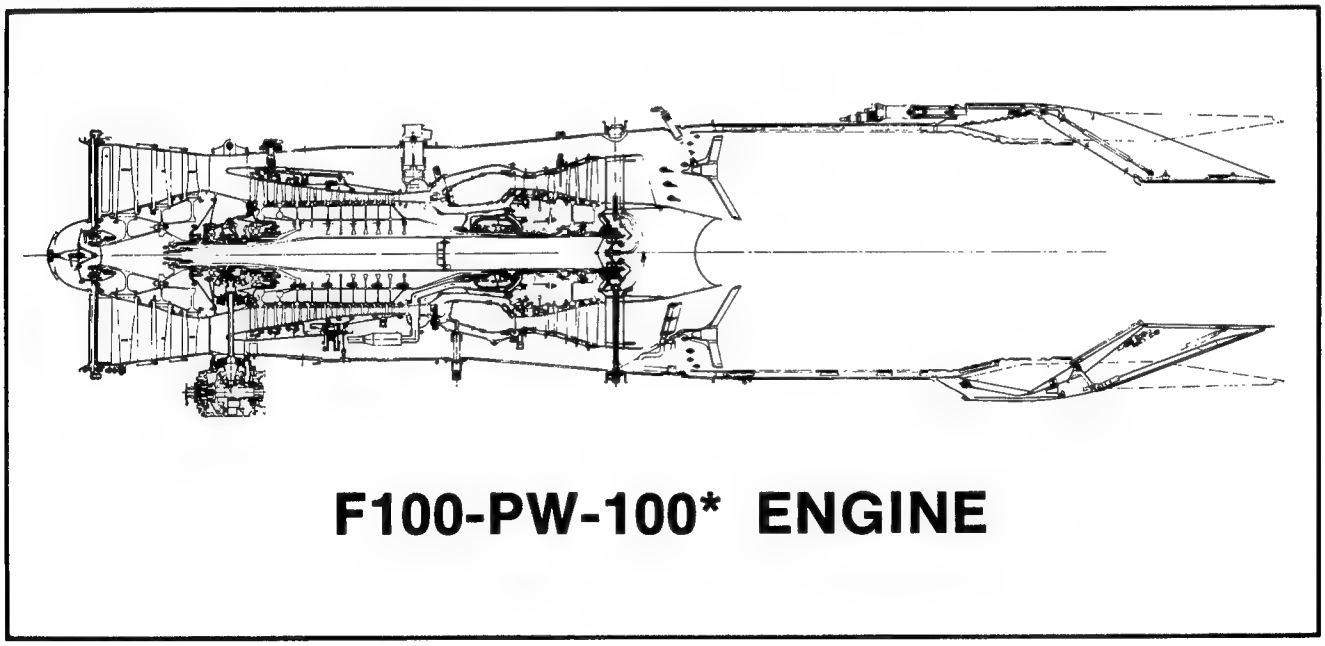
program, and the willingness of Tactical Air Command to divert a portion of its F-16 spare engines to the production line. In this regard, Systems Command repaid the F-16 loans on schedule by May 1981 and returned the 47 "Have Swap" engines by March 1981, one month ahead of schedule. Finally, an all-out effort by Pratt and Whitney and San Antonio in the final quarter of 1980 resulted in completion of project "Pacer Basket" as scheduled in December. The impact of the team's efforts on field and depot support was much more difficult to assess, but indications were that it had a positive influence. For example, during the period from August 1979 to May 1981, the "not mission capable supply" rates for F100s fluctuated between 11 and 22 percent in comparison to more than 40 percent in early 1979. Also during the same period, the shortages of aircraft engines in the field dropped from approximately 80 to zero. In fact, there were enough F100s in May 1981 to fill all aircraft requirements with eight to spare. Finally, spare parts were produced in sufficient quantities to support the growing depot workload mentioned earlier.

". . . there were enough F100s in May 1981 to fill all aircraft requirements . . . ."

The Strike Recovery Team relied on collective judgment and cooperation to balance the competing demands of field readiness versus new aircraft production and thus achieved an optimal Air Force solution to the F100 crisis. In a letter of 12 May 1981 to the commander of Air Force Systems Command, Gen Bryce Poe, Commander, Air Force Logistics Command, wrote that ". . . adherence to the strike recovery principles has enabled the F100 program to overcome the effects of these strikes and improve the support posture of the engine." He went on to say that the principles ". . . should be continued beyond the strike recovery period" (1). In response to Gen Poe's observations, the deputy for propulsion established an F100 Readiness Working Group to continue the intercommand/contractor review and resolution of supportability problems pertaining to the F100. Like the former recovery team, this new group will face the same dilemma—too many demands for a limited supply of critical parts. At stake will be the future worldwide readiness posture of F-15 and F-16 fleets.

References

1. Letter from Gen Bryce Poe, II, Commander, Headquarters Air Force Logistics Command, to Gen Robert T. Marsh, Commander, Headquarters Air Forces Systems Command, 12 May 1981.
2. Pratt and Whitney Aircraft. "A Step Ahead." Government Products Division, April 1980.
3. U. S. Department of Commerce. Domestic and International Business Administration, Bureau of Domestic Commerce. *Defense Materials System and Defense Priorities System*. Washington, DC: Publications Sales Branch, Dec 1976. DOC directives are the ". . . most powerful actions taken to expedite and resolve a Special Assistance Request. A defense contractor must accept and comply with each directive issued to him" (p. 10). The directives have priority over all military and commercial work.



F100-PW-100* ENGINE

*F100-PW-100 denotes the F-15 configuration of the engine and F100-PW-200 the F-16 configuration.

CAREER AND PERSONNEL INFORMATION

Military Career Management

Aircraft Maintenance: Real Time Solutions to Real Time Problems

Background

Why cannot the Air Force train individuals and keep them on a given aircraft or support system their entire career? Why do SAC maintenance people go overseas and upon return go to another command? Why can we not reassign people on the basis of their special experience identifiers (SEIs)? These were just a few of the questions being asked AFMPC in early 1980. MPC had no great problem in finding and providing good answers to these questions but that was not the root of the issue. Instead the problem was that answers were coming from every direction and from all levels, and most of the correspondence contained parochial solutions that just were not applicable Air Force wide.

The MPC position had long been that it was not opposed to changing the personnel system if it would improve aircraft maintenance. However, MPC wanted to make smart changes—those that would be good for the maintenance community as a whole–and not just help one agency at the expense of others. What was needed then was a focal point to sort out the problems, questions, and, more important, the solutions to help decide the best course of action. This focal point was found at HQ USAF/LEYM, Maintenance Policy Division, Directorate of Maintenance and Supply.

After a brief exchange of correspondence, it was decided that the best approach would be to begin with an education process that would provide a mutual understanding of the policies and procedures existing on both sides. Initial discussion centered on the "whys" and "wherefores" of the procedures used to select and return people from overseas; classification structure and policy; and how the SEI is awarded, used in assignments, and withdrawn. This early session was so enlightening that it was later decided to bring in DP and LG representatives from the MAJCOMs for a similar exchange of ideas. Thus was born the Maintenance Personnel, Training, Classification and Utilization Conference (MPTCUC). There were to be four conferences.

The first conference was held 31 Mar-4 Apr 80 at Randolph AFB. The CONUS flying MAJCOMs were in attendance as well as the Alaskan Air Command. Staff agencies represented included the Logistics Management Center, Air Force IG, AF Data Design Center, and AFMPC. The agenda of the first meeting was devoted to education, with the assignment and classification systems being examined initially. The design of both systems was found to be responsive and working. There was, however, widespread agreement that minor procedural adjustments could result in significant improvements. Fourteen formal taskings were made. They included exploring the feasibility of such enhancements as increased SEI coding of assignment allocations, expanding the assignment selection window, and shredding the bomber/cargo crew chief AFSC.

The second conference in Jul 80 had an expanded attendee list which included representatives from both PACAF and USAFE, along with the ANG and AFRES. Obviously the word was out—this was the place to bring your problems. If the theme of the first meeting could be called "education," the theme of this meeting could be called "work." MAJCOMs brought up issues such as shredding the bomber/cargo crew chief AFSC (approved) and expanding the assignment selection window (tabled) and SEI linkage (continued). Throughout these deliberations, maintenance people discussed the relative pros and cons of various issues on the basis of CONUS/overseas authorization ratios and the impact they might have on the lives of the people involved. Thirty-one formal taskings were made ranging from a complete review of the SEIs listed in AFR 39-1, *Airman Classification*, to suggested changes to the chief enlisted manager (CEM) code breakout.

Conferences three and four (Oct 80 and Mar 81) brought continued involved interaction and equally impressive results. Decisions were made to audit aircraft maintenance SEIs (an initiative which has enhanced person/job match), tighten removal criteria, and implement a linkage system.

In retrospect the MPTCUC concept worked exceedingly well, possibly because of three conditions that existed: *everyone had his say, no policy or procedure was sacred,* and *anything could be changed* as long as it benefited everyone. As a sounding board, these conferences worked; they did not circumvent any AF policy, but instead speeded up the personnel policy process.

The Transition

Simultaneous with the MPTCUC initiatives, HQ USAF/LEY was taking a long, hard look as to whether or not we could afford to continue to do business ten years from now as we do today. Out-year projections of 17-19 year old U.S. population decreases, weapon system sophistication increases, civilian airframe/mechanic requirement increases, and the decline in the national industrial base were reviewed. The overall picture showed that there will be tougher days ahead and that we must retain our experienced people. Therefore, Project RIVET READY was born—a vehicle for a comprehensive review of how we will need to conduct maintenance business.

Due to the complexity of the issues, three sub-panels were formed under the RIVET READY rubric: Policy and Procedures (chaired by LEYM), Personnel and Training (chaired by LEYM), and Requirements and Resources (chaired by LEYY). The previously discussed goals and objectives of the successful MPTCUCs were transferred to the Personnel and Training sub-panel in Nov 81.

(continued on page 21.)

Logistics Civilian Career Enhancement Program (LCCEP)

The LCCEP has been in operation slightly over one year now and is proving to be quite an effective method for furthering the development of career logisticians. The intent of the program as stated in the implementing regulation is "to encourage and manage the development of logistics personnel to their fullest potential to meet the mission needs of the Air Force."

The USAF in general and we in personnel in particular are always in need of highly skilled professional logisticians to meet both current and future needs. The LCCEP is an effective vehicle to identify and develop such logisticians to the high level of proficiency required by the Air Force. Hopefully then we will have the "professionals" identified and ready when the USAF calls for them.

One of the first things many people think of when you mention the LCCEP is the "Cadre." This is a select group of individuals within the listing that have been identified through rigorous Air Force-wide competition as high-potential employees for development to senior logistics positions. The Cadre is definitely an important part of the program, and competition for Cadre selection is very keen; however, the program is not limited to the Cadre; it is indeed much broader in scope.

All personnel who register in the LCCEP are included in the *Executive Force Inventory*. Members of this grouping may apply for Cadre inclusion, but only a small percentage of them can be selected. Inventory listed members are considered for vacancies in all Career Essential positions and for Cadre Reserved positions when there are less than 10 Cadre members available who are highly skilled in the specialty of the positions. A table at the end of this article shows how well those members have progressed in the area of promotions. Cadre members have additional benefits accruing in the form of special advice and career counseling, to cover training opportunities, career broadening, and promotion consideration for Cadre Reserve positions. The recent Cadre Selection Cycle II added 412 new members to the Logistics Executive Cadre.

The program regulation, AFR 40-110,, Volume IV, contains guidelines for career planning and enhancement which can be beneficial to all logistics employees. The Cadre selection criteria are included in the attachments to the regulation and provide a condensed list of items considered important in the development of a logistics executive. This information can be useful to any logistics employee in establishing objectives for personal career growth.

Employees who have constructed career plans according to the concepts of the LCCEP know where they are going and how they plan to get there. This action of working to achieve specific goals makes them more effective in accomplishing the Air Force mission and enhances their promotion probability. Our future leaders have established their objectives and are working to achieve them.

LCCEP ACTIVITY
(FY 81)

	Cadre Reserved	*Career Essential*	*Total*
CERTIFICATES ISSUED	98	90	188
Selections:			
Cadre	57	15	72
Non-Cadre	15	38	53
Outstanding Certificates	14	21	35
Promotions:	65	49	114
Cadre	50	14	64
Non-Cadre	15	35	50
Lateral Reassignments:	7	4	11
Cadre	7	1	8
Non-Cadre	0	3	3

POSITIONS FILLED BY GRADE	*GS-12*	*GS-13*	*GS-14*	*GS-15*	*Total*
	35	40	37	13	125

LCCEP PARTICIPANTS (JAN 82)	*Cadre*	*Inventory*
	948	8,698

Source: (OCPO/MPKCL) Randolph AFB, TX

Military Career Management continued from page 20.

RIVET READY
(Personnel and Training)

The initial meeting of the RIVET READY Personnel and Training Panel was held in Nov 81 with the express purpose of defining and/or refining the RIVET READY charter of the panel. The overall objective was to improve mission capability by increasing the number of aircraft maintenance personnel who are qualified on their assigned weapon system and at the same time to enhance their technical proficiency. This goal will be pursued by a variety of interrelated initiatives in the areas of personnel assignments, classification policies, training strategies, and work force utilization improvements. In support of the overall objective, a series of interrelated general supporting objectives were developed.

Pursue continued improvements in the interaction between the maintenance, manpower, and personnel systems to insure responsive and timely procurement, classification, training, and assignment of maintenance personnel to meet current and projected mission requirements.

Retain sufficient numbers of qualified technicians who possess the skills, professional qualifications, and commitment to meet both present and future mission demands of the Air Force.

Eliminate, reduce, or modify ancillary training, ancillary tasking, additional duties, and testing requirements for aircraft and equipment maintenance personnel that do not directly contribute to their technical job proficiency or performance—that is, improve productivity.

Insure proper and tangible recognition, support, and awareness of the maintenance contribution to the Air Force mission; and enhance the professional development of both maintenance technicians and maintenance officers.

In closing the first meeting, the panel chairperson acknowledged that the successes of the MPTCUCs indicated that the same individuals and/or agencies would participate in future similar initiatives.

The Future

A handful of responsible and concerned individuals had realized the need for face-to-face problem solving which involved personnel in the aircraft maintenance and personnel arenas. The quantum leaps that have been made to enhance the lot of maintenance personnel are now a matter of record, and there is every reason to expect that the same dedication and momentum we have achieved during the past two years will continue. If you feel that a personnel/maintenance policy or procedure is impeding the way you do business, find out who is your RIVET READY representative and ensure that your concern or suggestion is voiced. It is a guarantee—RIVET READY will take a shot at solving it!

(Major Jim Robbins and Major Dave P. Csintyan, HQ AFMPC, coauthored this section.)

Leadership and Management: A Conceptual Model with Definitions

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Abstract

Leadership and management ought to be treated separately. Organizational health can improve if clear definitions of both techniques are offered and understood. This short conceptual work suggests a model and offers definitions.

Introduction

What is leadership and what is management? Ask this question and be ready for the arguments which will invariably follow. If you turn to the literature for an answer, you will soon find that the confusion only increases. The confusion stems from the fact that there are many different schools of thought, some of which are diametrically opposed.

One school of thought poses the argument that management, which is composed of a number of functions, includes the process of leadership. Those who align themselves with this school will quickly tell you that management is all encompassing and that leadership is simply a subset of the "directing" function of management.

Another school will readily counter the first argument by proposing the idea that leadership is a much broader concept than the concept of management. They see management as a special leadership process which focuses on the accomplishment of organizational goals. In other words, leadership is the all encompassing concept and the functions of management are simply tools employed to assist the leader in accomplishing the organization's objectives.

Two final arguments, which again seem to be opposed to one another, muddy the water further. There are those who view leadership and management as one and the same. This opinion is based on the idea that both concepts - viewed as processes - involve "getting things done through others." The opposing viewpoint is one which simply states that the two concepts are separate and distinct - that leadership and management are dissimilar processes which are in no way related.

This oversimplified review of the various arguments serves to make two important points. First, there are a number of viewpoints concerning the relationship between leadership and management. Because of this wide range in thinking, it becomes very difficult to develop a useable understanding of what leadership and management are with respect to one another. Second, if a relationship exists between the two concepts, the confusion generated by the various arguments serves only to cloud the issue. The tendency is to get hung up on the arguments themselves, and little gets done in the way of developing the relationship in such a way that it can become useful as an initial learning framework or a basis for curriculum development.

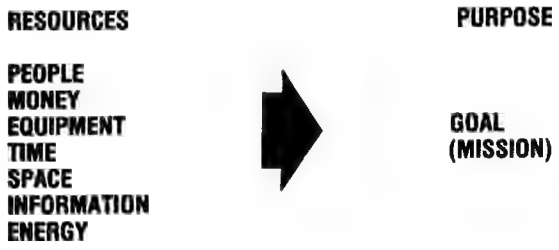
The remainder of this paper provides a theoretical model which describes the processes of leadership and management as they might be related to each other. From the theoretical description of the two processes, we can derive definitions of leadership and management which help to answer the original question, "What is leadership and what is management?"

Discussion

Any attempts to define or describe leadership and management in an organizational sense have to begin with a discussion about the very existence of the organization itself. The question is, why do organizations exist - why are they even formed? The answer, which should generate little disagreement, is that organizations (two or more people by definitions) are formed to accomplish an objective that otherwise could not be accomplished by a single individual. In other words, the basic purpose of any organization is goal or objective accomplishment:

ORGANIZATION ——→ GOAL

If the purpose of the organization is to accomplish a goal or reach an objective, it follows that the organization will have to expend or apply resources in reaching that end. As a minimum, an organization of only two people, with no other resources than the two people themselves, will apply this human resource toward the accomplishment of its goal. However, most organizations have more resources at their disposal than just their people resource. Not intended to be an all inclusive list, the following are examples of resources which an organization can apply toward its objective:



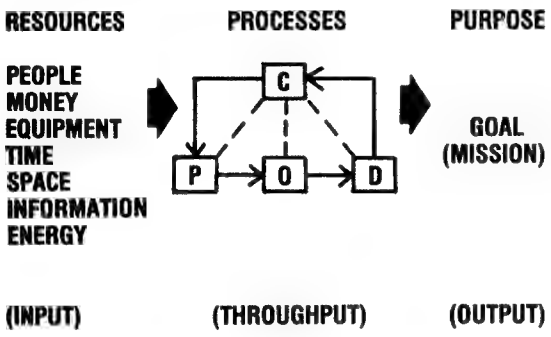
It should be noted that we are not discussing the effective or successful application of resources, but are simply making the point that any organization applies resources to accomplish its goal. If it is unable to do so, the organization will probably not remain in existence or prosper for very long.

At this point the question becomes, how does the organization go about applying its resources to an objective? If the organization's resources are its input and the goal or objective is its output, what are the throughput mechanisms or processes which facilitate resource application? Let us first consider the concept of management as a process.

Regardless of the school of thought to be considered, management consists of a number of functions or subprocesses designed to aid in the application of resources. In other words, these functions of management assist the organization in applying the right resources in the right

quantity at the right time. The central idea here is that *all* resources, to include the human resource, must be managed (or applied), and the functions of management collectively form the process which allows the organization to do so.

Again, realizing that different schools of thought have developed different listings relative to the functions of management, for the purposes of this paper the functions of planning (P), organizing (O), directing (D), and controlling (C) will be used. (For those who choose to add such functions as staffing and coordinating, the theoretical model being developed here will easily accommodate those viewpoints.) The management process, consisting of its functions, can be shown as a throughput mechanism in the following model:

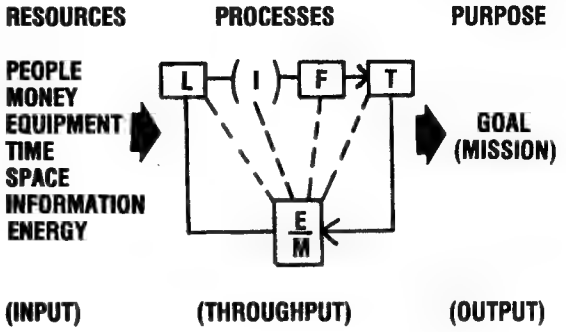


At this level of development, the model reflects the idea that the management process is one mechanism which allows the organization to apply *all* resources to an objective. Considering the process itself, what is being said is that the organization must plan, organize its resources, and direct (employ) those resources in such a manner as to accomplish its goal. Beyond this effort, however, the organization must also actively control the outcome or level of goal accomplishment. The control function, then, is designed not only to bring actual performance into line with expected results, but it is designed to improve or enhance the other subprocesses (or functions) as well.

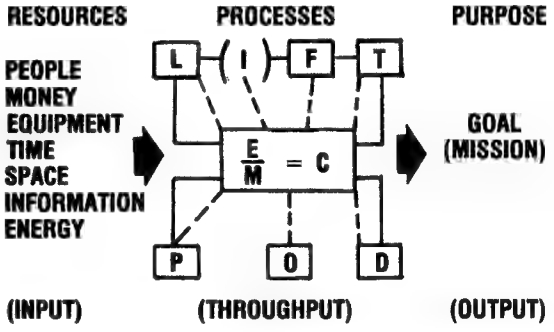
If it were not for the people resource in organizations, the management process would probably suffice as the only mechanism needed to assist in the application of resources. But we have already said that as a minimum all organizations have human resources. Because of the human element associated with the people resource, an additional process must be used if an organization is going to effectively apply *that* resource to its objectives. Stated another way, leadership is an additional process which can be employed to deal with the unique human dimensions of the people resource.

A review of contemporary literature indicates that, as a process, leadership consists of a number of elements. As a minimum, the leadership process consists of a leader, a follower, and a task. Some writers choose to include the situation as a process element; however, for the purposes of our development here, the situational element will be narrowed down to the influence attempt which exists between the leader and the follower. In other words, the infuence attempt - which involves many theoretical concepts such as motivation, communication, and delegation - is the link between the leader and the follower.

If the leader attempts to influence the behavior of the follower in an effort directed toward task accomplishment, then we could say that the elements of the leadership process are the leader (L), the influence attempt (I), the follower (F), and the task (T). As parts of the process, the elements of leadership must continually be evaluated and modified (as necessary) if the organization expects to reach more effective or higher levels of outcome. Used as a feedback mechanism, the evaluation/modification (E/M) element of the leadership process serves to improve the other elements of the process and, hopefully, increase the level of task accomplishment. In terms of the theoretical model being developed here, the leadership process, designed to deal with the human aspect of the *people* resource only, can be shown this way:



The evaluation and modification element of the leadership process serves to control task outcomes in a manner similar to that of the control function in the management process. In fact, regardless of the choice of words or the process being considered, evaluation/modification and control are one and the same. If a leader/manager is employing both processes simultaneously, it is often difficult to separate that activity which is management control from that activity which is leadership evaluation and modification. Based on the common element or function of control, the two simultaneously occurring processes can be reflected in this manner:



Although simplistic in many respects, the completed model does include the accepted elements of both processes; it reflects a general relationship between the two processes; and finally, it describes how an organization goes about applying all of its resources toward the organizational objective.

Conclusion

You will recall that the original question asked was "What is leadership and what is management?" Reflecting on the model just developed, we can say that:

Leadership is a continual process consisting of: (1) influencing the behavior of individuals or groups in an effort directed toward goal accomplishment, and (2) evaluating and modifying the elements of the process to enhance that effort.

Management is a continual process consisting of various functions designed to facilitate the employment of all organizational resources.

Beyond these specific definitions, we can now generalize and say that, taken together:

Leadership and Management are two simultaneously occurring processes designed to assist in the application of resources toward organizational goals.

As processes, leadership and management are not totally distinct from one another nor are they completely the same. Viewed in the manner just presented it is hard to accept one concept as being all encompassing and including the other. However, we can safely say that both processes, fully understood and effectively used, will enhance an organization's efforts to apply its resources for maximum benefit.

Most Significant Article Award for 1981

The Editorial Advisory Board has selected "A Rendezvous Building with the Soviet Union" by General Bryce Poe, II, USAF, as the most significant article published in the *Air Force Journal of Logistics* during 1981.

Most Significant Article Award

The Editorial Advisory Board has selected "Modification of the Standard Base Supply System Stock Leveling Techniques" by Major Kenneth B. Faulhaber, USAF, as the most significant article in the Winter 1982 issue of the *Air Force Journal of Logistics*.

"Strategic theorizing is to strategic planning as basic scientific research is to applied technology. Creative thinkers, whose mission is originality, not current problem-solving need much greater intellectual latitude than crisis managers."

John M. Collins in Grand Strategy.

CURRENT RESEARCH

Air Force Business Research Management Center (AFBRMC)

The AFBRMC, located at Wright-Patterson AFB, was activated in July 1973 as the Air Force focal point for research into the system acquisition process. The emphasis on research is to develop new knowledge, adopt commercial practices or validate existing knowledge which has direct application to the system acquisition process and will result in monetary savings, acquisition of higher quality systems or reduce the time to acquire new systems.

The AFBRMC reports directly to the Hq USAF Director of Contracting and Manufacturing Policy. Research needs are derived from the MAJCOM's either directly or through the AFBRMC Board of Advisors. Once a need is approved by the Board of Advisors the AFBRMC links the need with a research activity. Selection of the research activity depends on the subject and scope of the need. Research is conducted within the USAF by students in graduate or doctoral programs and PME students, or by civilian activities such as colleges, universities or commercial research firms, through Air Force contracts. Once the study is complete, the AFBRMC distributes the results and makes recommendations for implementation.

Further information may be obtained by calling the Air Force Business Research Management Center, Autovon 785-6221 (Commercial 513-255-6221).

On-going Research Managed by the AFBRMC

AFLC Program Objective Memorandum (POM) Forecasting Accuracy
Objective: Develop a methodology for improving AFLC POM forecasting accuracy for budget program 1500 (aircraft replenishment spares).
(Capt Tankersley, AFBRMC/RDCB)

Improved Modification Management
Objective: Identify and recommend an approach to solving major problems of aircraft modification management.
(Capt Tankersley, AFBRMC/RDCB)

Decision Process Models of Contractor Behavior: The Development of Effective Contract Incentives
Objective: Validate the simulation decision process model of contractor behavior and its application to developing and testing alternative incentive schemes which involve scenario analysis, sensitivity analysis and external evaluation by experienced managers.
(Maj Golden, AFBRMC/RDCB)

Managerial and Economic Performance of Firms in the Aerospace Industry
Objective: The purpose of the research is to define, as precisely as possible (from existing available public sources), the Air Force industrial base, and to determine the financial, economic, and accounting characteristics of those system suppliers. The basic methodology in this research is the inductive or "build-up" approach using the files (as defined by COMPUSTAT). This phase will have considerable direct relevance to the acquisition process of the Air Force, because the researchers will be dealing directly with the accounting, economic and managerial characteristics of the suppliers at the appropriate segment level.
(Maj Golden, AFBRMC/RDCB)

Improved Life Cycle Cost Estimating
Objective: To adjust the current LCC model used at ASD/ACCL to reflect a more practical application ability.
(Capt Tankersley, AFBRMC/RDCB)

Software Cost Estimation Technique
Objective: Identify and evaluate current software cost estimating models. Determine their accuracy and applicability given real software cost estimating problems.
(Capt Tankersley, AFBRMC/RDCB)

Airframe Cost Models by Aircraft Type
Objective: Identify and evaluate parametric life cycle cost models that use parameters that are particular to a specific aircraft type—as opposed to models that use generalized parameters for all airframes.
(Capt Tankersley, AFBRMC/RDCB)

Multi-Year Procurement Opportunities
Objective: Multi-year is conceptually ideal. However, the concept is still not completely understood and may be subject to misuse. Analyze examples of proper use and improper use.
(Capt Tankersley, AFBRMC/RDCB)

Improving the PROD RATE Concept
Objective: Using F-16 production cost data, determine the true effect of production rate variability on unit cost. Establish a firm statistical foundation for the effect of production rate on the unit cost of a weapon system.
(Capt Tankersley, AFBRMC/RDCB)

White Collar Productivity Measurement for Aerospace Firm Source Selection
Objective: Investigate the current "productivity crisis" in the U.S. and its Air Force aerospace firms. Investigate what has occurred in the blue collar measurement area. Investigate current initiatives and productivity measurements in the white collar area which are used as a means to enhance efficiency and effectiveness. Establish and/or refine measures of white collar productivity relative to Air Force aerospace firms.
(Maj Golden, AFBRMC/RDCB)

Foreign Governments Involvement in the U.S. Acquisition Process
Objective: (1) Investigate relationships between foreign governments and their national firms in the Pacific area. (2) Identify common foreign international and cooperative business practices and arrangements. (3) Determine the contract vehicles (i.e., offset, coproduction agreements) which will most easily interface with foreign business practices.
(Maj Golden, AFBRMC/RDCB)

Value Engineering—How Can We Increase its Effectiveness?
Objective: Determine why value engineering is not realizing its full potential and what changes should be made in the program to increase its effectiveness. Determine whether value engineering clauses can be effectively managed to prevent increased research and development budgets.
(Lt Peck, AFBRMC/RDCB)

Software Data Item Development
Objective: Develop proposal evaluation criteria and contract terms and conditions aimed at fostering realistic contractor cost, performance, and delivery date estimates. Develop a set of guidelines for monitoring and managing progress of software development. Develop a method to set and describe milestones and measure their percent completion on a program. Describe incentives to increase the effectiveness of software development-control.
(Lt Peck, AFBRMC/RDCB)

Planning and Scheduling at ASD: Review and Recommendations

Objective: Phase I was a review of planning and scheduling at ASD. Phase II is a recommendation to improve ASD planning and scheduling.
(Capt Tankersley, AFBRMC/RDCB)

Cost Index Method of Economic Price Adjustment (EPA)
Objective: Using EPA User's Guide developed by previous researcher; update, simplify, and translate mathematical and theoretical approach to use of Cost Index Method of EPA adjustment.
(Lt Peck, AFBRMC/RDCB)

Methodology for Identifying the Defense Contracting Capabilities of Small Business
Objective: Develop a methodology for identifying and evaluating small business and economically and socially disadvantaged small business firms, capable of performing work for the DOD.
(Maj Golden, AFBRMC/RDCB)

Measuring Productivity of the Aerospace Firm
Objective: Develop a relatively simple, reliable and inexpensive method of measuring productivity at the firm level.
(Maj Golden, AFBRMC/RDCB)

An Evaluation of the Effectiveness of Incentive Type Contracts in the Aerospace Industry
Objective: Evaluate the effectiveness of incentive type contracts in the aerospace industry by evaluating the basic assumptions underlying the concept.
(Maj Golden, AFBRMC/RDCB)

Contract Administration Service (CAS) Agency Involvement During Conceptual Phase of Acquisition
Objective: Develop a procedure to evaluate the effectiveness of early involvement of the CAS in system acquisition and identify the areas of involvement.
(Maj Weber, AFBRMC/RDCB)

Profit/Fee Objective for R&D Contracting
Objective: Develop a realistic profit/fee objective in the R&D contracting environment.
(Maj Weber, AFBRMC/RDCB)

Improving the Effectiveness of Contract Negotiations
Objective: Measure perceptions of the need for improving the effectiveness of Air Force personnel in contract negotiations (foreign & domestic). Emphasizes: (a) Identifying negotiation skills that need improvement. (b) Negotiation pecularities of foreign environment.
(Maj Weber, AFBRMC/RDCB)

Cost Functions for Airframe Production Programs
Objective: Develop and test the use of a new approach to estimating the cost of a production program.
(Capt Tankersley, AFBRMC/RDCB)

DOD Systems Acquisition Policy: A Systems Dynamics Model and Analysis
Objective: Provide a validated and verified macro policy model of the DOD acquisition system that can be used by acquisition managers and analysts to evaluate the system and policy alternatives.
(Capt Tankersley, AFBRMC/RDCB)

An Evaluation of OMB A-109 Policies and Their Effectiveness in Improving the Initial Phases of the Process by Which the AF Acquires Major Weapon Systems
Objective: Evaluate how the major policy thrusts of A-109 concerning program control, competition, and innovation have affected the acquisition process.
(Capt Tankersley, AFBRMC/RDCB)

Examination of Implications of Moving Away from FMS Procedures for A/C Sales with Emphasis on F-X Intermediate Export Fighter
Objective: With emphasis on new FMS procedure through increased competition, open market, and decreasing regulation, what is sound AF strategy for selling aircraft to foreign nations.
(Capt Tankersley, AFBRMC/RDCB)

Long and Short Range Costs and Benefits of Make-or-Buy Policy
Objective: Develop criteria and guidelines for program managers to use in determining when to apply make-or-buy evaluations by contractors.
(Lt Peck, AFBRMC/RDCB)

Criteria for Selecting Scheduling Techniques
Objective: Several scheduling techniques have been recommended to ESD for use of highly visible programs (particularly planning and analysis). Appropriate criteria need to be developed to assist in the selection of the most valid approach. Study will review scheduling requirements for various planning situations, review established scheduling approaches, and identify appropriate approaches for use in various planning situations.
(Capt Tankersley, AFBRMC/RDCB)

Evaluating Subcontracting Management Plans for Small Business & Disadvantaged Contracts
Objective: Develop criteria for evaluating the effectiveness of Subcontracting Management Plans.
(Maj Golden, AFBRMC/RDCB)

AFLC, FY82 Logistics Studies Program

In the Air Force Logistics Command, the Directorate of Management Sciences (XRS), Deputy Chief of Staff Plans and Programs, is responsible for developing, managing, and executing the Command's Logistics Management Sciences Program. The primary goal of the program is to support Command initiatives through application of operations research methods in both organic and contract studies. Principal areas of focus for the next year are:

a. Requirements: Conduct studies to develop better logistics resource requirements computation methods; improve the capability assessment tools to forecast the impact of logistics resources; and develop methods to improve data availability, validity, usability, etc.

b. Jet Engine Management: Develop better methods to determine engine requirements; conduct readiness assessments using the JEMS series of models for both modular and non-modular engines; and also, use the OMENS and Dyna-METRIC models to conduct readiness assessments.

c. Cost Systems: Continue analytic support to the VAMOSC Project Office.

The Directorate of Management Sciences consists of 29 personnel, five of whom are military. Most of them are operations research analysts (ORs) who function as consultants to our study sponsors. The sponsors provide the data, policy, procedures, etc., and work with the ORs in defining the problem and the desired product. We are structured into three divisions:

a. Management Sciences Division, XRSM, Dr. W. E. Dickison, Chief. The division conducts studies in the cost systems, maintenance, and related areas.

b. Logistics Systems Laboratory Division, XRSL, Mr. John L. Madden, Chief. This division focuses its efforts in the area of jet engine management.

c. System Sciences Division, XRSS, vacant. This division focuses primarily on issues within the requirements area.

Completed Studies

a. *Purchase Request Manpower Model.* Developed a computer simulation model capable of predicting future work backlogs based upon current manpower levels.

b. *Procurement Contract Analysis Model.* Documented a SIMSCRIPT model which computes critical paths for procurement contract processing cycles using network analysis techniques and probabilistic processing cycles network analysis techniques and probablistic input data for the DCS/Contracting and Manufacturing.

c. . *Preliminary Study of Failure Models.* Compared the accuracy of various mathematical models for predicting failures of any recoverable item peculiar to an individual weapon system. Phase I studied the C-5 and C-141; Phase II studied the F-15 aircraft. The study suggested that there is no better determinant overall for recoverable item line replaceable unit requirements than flying hours.

d. *Simulator Management Location Effectiveness Study.* Determined the feasibility of cutting the lag time between the modification of the Aircrew Training Devices (ATD)/Simulator and its respective aircraft by collocating the management responsibilities. Developed a time-phased flow chart of ATD/Simulator modification process analyzed the process as is and with changes; weighed the costs and benefits of each; and made recommendations concerning organizational relationships and methods to reduce the lag time.

e. *VAMOSC II Support* (Visibility and Management of Operation and Support Costs—a macro cost model).

(1) Evaluation of Depot Maintenance Cost Allocation. Verified the algorithms used in the depot maintenance cost systems, recommended changes, and assessed approximate value of the data provided for VAMOSC II use.

(2) Acquisition and Training Cost Portrayals. Verified data sources, validated algorithms, and where appropriate located other data sources and developed new algorithms.

f. *Allocating Assets According to the HQ USAF Force Priority Matrix.* Determined what the "War Readiness Spares Kit/Base Level Self-Sufficiency Spares (WRSK/BLSS) Requirements, Assets, and Funding Project System" does, validated it using test data, and modified it to automate asset allocation for each item.

g. *F100 Engine Requirements Evaluation.* For the F-15 aircraft, used the Dyna-METRIC model to evaluate logistics performance of computed spares quantities during the peace-to-wartime transition.

h. *Wartime Assessment and Requirements System (WARS).* Developed WARS as an integrated system for computing the total wartime requirement for recoverable item spares necessary to support any war scenario. In addition, WARS can be used to relate any recoverable item asset position to a daily sortie generation capability by squadron. The design of the system is complete. A contract for development and implementation has been awarded.

Selected Current Organic Studies

a. *Jet Engine Management Simulator (JEMS).* This project continues as the test bed for developing improvements in input/output and for testing logic changes. The model is being adapted for both modular and non-modular engines (MJEMS and TMEMS). We developed and documented the capability to predict daily aircraft readiness due to engine support alone for any given scenario and program for aircraft. Both Military Airlift Command (MAC) and Tactical Air Command (TAC) are using the current JEMS model.

b. *Generalized OMENS.* We modified the Opportunistic Maintenance Engine Simulator (OMENS) model for generalized use for any modular type engine. It is currently being used for the TF34 engine with future work on the TF33 engine and also the F101 and F108 engines. The model is being implemented by the Oklahoma City and San Antonio Air Logistics Centers.

c. *Dyna-METRIC.* This model is being used to evaluate logistics performance of computed spares quantities during the peace-to-wartime transition. We are currently doing analysis on the A-10.

d. *CREATE Replacement Specifications.* A study to determine the requirements (kind and quantity) for the CREATE computer for 1983 thru 1987 was completed last year. This effort is to prepare the specifications for the replacement system.

e. *Embedded Computer Systems Management Information Systems.* We are assisting the Directorage of ADP Resources (LMD) and the Directorate of Engineering and Comptuer Resources (LOE) to identify and define a system or systems which will: (1) specifically identify a weapon system's embedded computer system (ECS) baseline; (2) provide status information for

configuration items in that baseline; and (3) identify requirements in applicable ECS baseline documentation impacted by a computer program configuration item (CPCI) change.

f. *VAMOSC II - Communications-Elecyronics (C-E) On-Site Operating Costs.* The purpose of this project is to develop a costing technique for operation of ground-based communications-electronics equipment powered by on-site generators and the compilation of contractor costs for maintenance of ground-based C-E gear.

g. *Maintenance Facility Capability/Utilization Study.* The purpose of this study is to develop a technique which can be used to identify and assess those factors (facilities, equipment, manpower, skills, spare parts, etc.) which impose limitations on the ability of depot maintenance activities to respond to a surge scenario.

h. *Implementation of Wartime Assessment and Requirements System (WARS).* The WARS designed was completed and accepted for implementation in the summer of 1981. We are now working with the contractor toward partial implementation by mid-1982.

i. *A Comparison of Forecasting Techniques for Predicting New Weapon System Item Requirements.* The purpose of this project is to compare the accuracy of various forecasting techniques with the phased factor method for predicting failures of new recoverable items applicable to new weapon systems phasing into the inventory.

j. *A System To Assist Research on the Wartime Assessment and Requirements System (STAR-WARS).* The purpose of this project is to develop a computer-based system which will permit research on (1) improving the capabilities of WARS and (2) using WARS techniques and outputs in future logistics studies.

Selected Contract Studies

a. *The Influence of Subjective Factors on the Quality of Soviet Aircraft Maintenance*

Purpose: Determine the influence that subjective factors (personnel attitude, initiative, etc.) have on the Soviet aircraft maintenance capability. AFLC Office of Intelligence (IN) is engaged in an estimate of the sustainability of Soviet military air operations. A principal element in the sustainability of any Air Force is the capability to get aircraft operationally ready and keep them that way; i.e. the function of maintenance.

Monitor: Capt C. McHargue (AUTOVON: 787-2588)

b. *Development of Initial Requirements Computational Algorithm*

Purpose: Develop and evaluate computational approaches for incorporating a simplified version of the WARS requirements computation methodology into the initial provisioning requirements computation process.

Monitor: Diann Lawson (AUTOVON: 787-3123)

c. *Standard Methodology for Determining Non-Aircraft (CE) WRSK/BLSS Requirements*

Purpose: Develop a computation methodology to compute prepositiond CE War Reserve Materiel (WRM) requirements. Develop a failure rate to reflect a wartime CE scenario and apply this demand to a failure CE application program. Interface this methodology into HQ AFLC prepositiond WRM requirements computation system.

Monitor: Diann Lawson (AUTOVON: 787-3123)

d. *Demand Distribution and Variance-to-Mean Ratios of Reparable Items*

Purpose: Review probability distribution functions and variance-to-mean ratio of demands and update using current data. Determine the function that best describes the relationship of mean demands for an item and the variance of these demands. Determine the probability distribution of demands for reparable items. Verify the appropriateness of the negative binomial and normal distributions currently used in the Air Force algorithms.

Monitor: Diann Lawson (AUTOVON: 787-3123)

e. *Joint Aeronautical Depot Maintenance Action Group (JADMAG)*

Purpose: Continue support of the tri-service effort. This year we will fund studies in the areas of workload prioritization and actual status of new technology planning in DOD aeronautical depots.

Monitor: Evelyn Bebout (AUTOVON: 288-4187)

f. *AFLC Logistics Management System (LMS) Modernization*

Purpose: Continue support of this effort. Areas to be funded include 8-10 logistics studies resulting in prototyped logical application groups (LAGs) with documented required systems capability (RSCs) to improve the Command's LMS.

Monitor: Maj C. Sebastian (AUTOVON: 787-4147)

Item of Interest

Regulation and Productivity: A New Study

"On the basis of the limited amount of research that has been done to date, we therefore conclude that anywhere from one-eighth to one-fifth of the slowdown in the growth of labor productivity in recent years has been due to government regulation."

. . . .

"The contributions to economic welfare that they are intended to make are, by and large, not reflected in marketed or measured output. These effects include improved health, greater enjoyment of recreation opportunities, and improved safety."

. . . .

"The task for future investigators is to identify more precisely those regulations whose benefits exceed the value of the conventional output that is lost when they are promulgated."

From "Government Regulations and Their Impact on the Economy" by Gregory B. Christiansen and Robert H. Haveman, *The Annals* (AAPSS, 459, Jan 1982)

STRATEGIC MATERIALS: AN AMERICAN ACHILLES' HEEL

Major Cecil J. Smith
Chief, Logistics Systems Division
Air Force Logistics Management Center
Gunter Air Force Station, Alabama 36114

Almost everyone has heard of Achilles, the mythical Greek hero of the Trojan war. According to the legend, Achilles became nearly invulnerable when his mother immersed him in the river Styx. To accomplish this she held him by the heel, thus creating one small and obscure chink in his armor of invulnerability which ultimately proved fatal.

Symbolically, the United States may be likened to Achilles since it has been a long-time world leader and is even considered a hero by many. Although never subjected to the waters of the Styx, it too had taken on an aura of invulnerability. Ominously, the similarities do not end there as it now appears that America's armor also has a lethal chink in it. An initial glimpse at this potential American Achilles' heel was generously provided by OPEC. Now our fear is that this chink, like Achilles', will also be fatal.

IS OIL OUR GREATEST PROBLEM?

The oil embargo of 1973 revealed that the United States had become dangerously dependent on imported oil. The embargo was basically an economic reprisal against nations that were supporting Israel in the Arab-Israeli War of 1973. In the long term it awakened lesser developed countries to the great economic power of their raw materials in relations with the world's superpowers. Of equal importance, the American people became aware of declining U.S. economic power and the dangers of overdependence on foreign markets for essential resources. Unfortunately, public concern concentrated mainly on oil while many other crucial materials could just as easily become tools of economic blackmail.

Consequently dependence on imported oil is only one element of a much larger problem. Equally or more important is U.S. dependence on "strategic materials." The extent of such U.S. dependence becomes vividly clear when comparing it with Soviet reliance on foreign sources for many of these same materials. As shown in Figure 1, the Soviet Union depends on imports for only 7 of 39 selected minerals and metals, and of those 7, only 2 approach 50 percent reliance. As a matter of fact, the Soviet Union is a net exporter of 22 of the 39 items and many of those are to the United States.

The USA imports only 30 to 40 percent of its petroleum requirements and much of that for convenience. In contrast, however Figure 2 shows that the U.S. depends on major importation for all but 1 of 36 selected minerals and metals. More important, it is 100 percent dependent for 3 of the items, more than 90 percent dependent for 9, and more than 50 percent dependent for 20. In addition to these appalling figures, many of the major sources for these materials are countries of questionable stability, friendship or reliability (e.g., the Soviet Union).

Furthermore, most of the materials listed in Figure 2 have undergone major price increases, and every indication is that such a trend will continue. A study of price increases for aerospace materials by the Army Aviation Research and Development Command in late 1979 reported: "The forecasted index values for most materials are rising. The material costs for most Command programs are increasing dramatically."[1] An example of "dramatic price increases" may be found in cobalt which is used extensively in the aerospace industry (30 percent of U.S. consumption), but also receiving increasing commercial application in paints, lacquers, varnishes, etc. In the two-year period from 1977 to 1979, cobalt rose in cost 600 percent.[2]

As stated earlier the general public feels directly, and almost immediately, the impact of increased prices for such commodities as oil, but the effect of rising costs for strategic materials is more hidden and indirect. Certainly, increases in the prices of such materials as copper, chromium, iron, and steel products, etc., will be reflected in the ultimate cost of automobiles and appliances. Such price increases are not directly attributed to dramatic increases in the costs of basic materials; however, they are more generally accepted by the public as by-products of inflation. Moreover, the public has a great deal more flexibility than the Department of Defense or the military services in accepting, rejecting, or adjusting to price increases. Since many of the materials in question play dominant roles in the development and production of weapon systems, an increase in the price of these materials can have

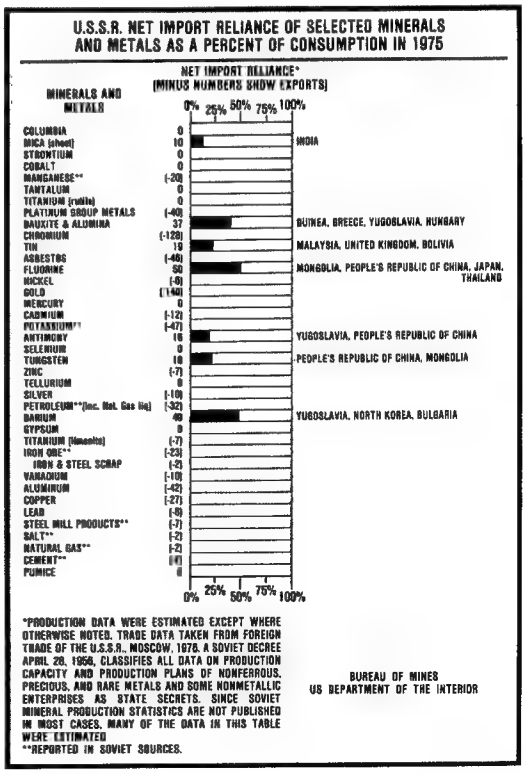


Figure 1.

a dramatic and direct impact on America's ability to produce such systems. The Department of Defense depends directly on finite allocations from Congress; thus, as prices increase, it is severly limited in its ability to react to such increases except by decreasing the quantity of weapons. As a result, strategic materials are becoming, if they have not already done so, the weak link in America's defense chain.

WHAT ARE STRATEGIC MATERIALS?

The *International Relations Dictionary,* second edition (1979), defines strategic materials as "raw materials and semifinished and finished products essential for fighting a modern war. The availability of strategic materials is a significant component in the determination of national power." A proposed U.S. Senate amendment to the Strategic and Critical Materials Stockpiling Act (50 U.S.C. 98 - 98H-1) in 1979 stated:

> (1) The term "strategic and critical materials" means materials that (A) would be needed to supply the military, industrial, and essential civilian needs of the United States during a national emergency, and (B) are not found or produced in the United States in sufficient quantities to meet such need.
>
> (2) The term "national emergency" means a general declaration of emergency made by the President or by the Congress.[3]

These definitions show basic similarities. For example, strategic materials are "essential for fighting a modern war" or supplying the "military, industrial, and essential civilian needs of the United States during a *national emergency."* (Emphasis added). Although "modern war" and "national emergency" are not exactly synonymous, both terms refer to conditions other than "business as usual." However, the complexities of the international situation, coupled with the apparent reluctance of the United States to use military power (e.g., Cuban involvement in Africa, non-confrontation with the Soviet Union over combat forces in Cuba, etc.) suggest that declarations of war or even a "national emergency" are unlikely except for major crises.

These conditions suggest that changed attitudes toward strategic materials and even new definitions are in order. Logic and common sense seem to dictate that certain non-fuel minerals should be labeled as "critical" if they are essential to the nation's economy in peace and war. If one considers the importance of such materials in peacetime for developing, improving, and maintaining a nation's defensive posture, they might also be considered as "strategic" with or without a condition of war or national emergency. Therefore, a more realistic definition of strategic materials might include the rather simplistic remark by Senator Stuart Symington on the need for a national materials policy: "What do we mean by materials? For current purposes the answer is just plain stuff to make things with."[4]

Strategic materials, then, should not be limited merely to materials that will sustain the country in a prolonged war or national emergency. The strategic list should also include materials that enable the country to maintain a defensive posture for deterring either condition. One method for assuring the availability of such materials is "national stockpiling." We need then, first, a dynamic list of defined materiels and second, a policy for procuring same.

HAVE STOCKPILING EFFORTS BEEN EFFECTIVE?[5]

The problem of scarce materials first received government attention as a result of World War I, but decreased in

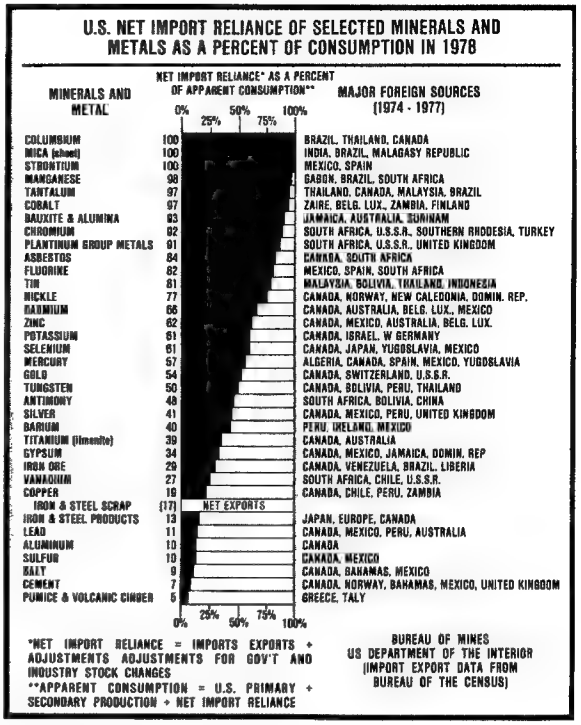


Figure 2.

importance when the country entered the Great Depression. World War II reopened the issue and led to passage of the National Stockpiling Act designed to insure an adequate supply of strategic or critical materials of military significance. Immediately following the War, the passage of the "Strategic and Critical Materials Stockpiling Act of 1946" sought to reduce or eliminate a "dangerous and costly dependence" of the United States on "certain strategic and critical materials" essential in a war emergency.[6]

However, the inclination of America to demobilize at the end of World War II probably had a negative impact on the effectiveness of, or attention given to, any stockpiling actions. The outbreak of the Korean Conflict, with the heavy reliance on helicopters and combat aircraft again reemphasized the importance of certain key materials in U.S. security capabilities. Also during this period the "blue ribbon" Paley Commission issued its historic report, *Resources for Freedom.* The report expressed serious concern over extensive U.S. dependence on foreign sources for certain materials and urged that four measures be taken at the national level.[7] First, complete statistics on the relation of the supply/demand curve of various materials must be carefully maintained and watched. Second, resource conservation should be stressed with concerted efforts to develop substitute materials and improve technology. Third, a nongovernmental, i.e., nonpolitical, organization should be established to monitor the availability and use of critical materials. And, finally, a presidential advisor, perhaps a new bureau or cabinet position, should be established to develop and direct a national materials policy. Unfortunately, the Paley report, released during an election year was "lost in the shuffle," and obscured by campaign activities. The report never got much public attention nor governmental action.

Other administrations and additional Congressmen have expressed sporadic cursory interest, but the rude awakening brought on by the oil embargo of 1973 and the obvious economic power of the OPEC cartel did much to rekindle congressional and executive interest. At the urging of several members of Congress in 1977, President Carter ordered a review of the non-fuel minerals policy by a special Policy Coordinating Committee composed of various executive departments and agencies. The committee was commissioned to address all salient aspects of the materials issue over a period of 15 months. However, the report issued by the committee some five months beyond the original deadline was a tremendous disappointment to the many people who had been highly optimistic about the committee's efforts.[8]

The committee had redefined its charter and had apparently diluted its purpose from the start by excluding seven of the nine key areas designated for study. Its report "glossed over the weakened financial condition of America's mineral industry and entirely omitted the national security aspects of America's growing foreign dependence."[9] Although the committee worked approximately 20 months and spent almost 3.3 million dollars, the nation still had no definitive policy on strategic materials.

WHAT ARE THE PROBLEMS WITH STOCKPILING?

Past efforts to develop national policy governing the stockpiling of strategic materials have shown several common characteristics. First, they were stop-gap measures, founded during crisis situations - World War I, World War II, the Korean Conflict, and the oil embargo. Second, they have reflected "rearward thinking" in the sense that they were designed to correct deficiencies reflected only in a given crisis. Third, they have been based on the concept of providing for war or national emergencies. In this latter regard, Congress originally established a five-year objective for stockpiling strategic materials but subsequently revised it to a three-year objective in 1958.[10] But none of these efforts gave any real consideration to the constant situation or to a realistic appraisal of future needs for any extended period.

Emphasis on supporting three- or five-year wars belies the realism of the current world situation and latest military estimates on the duration of the next war. Prior to the most recent crisis in the Middle East, Europe was considered the potential site for a future war; and by NATO standards, such a war would last approximately seven days. Although conventional wars are continuing possibilities, even these wars should last only for limited periods. This opinion is based on U.S. experience in Vietnam and the likelihood that the United States will be much more selective in choosing its future wars.

Therefore, instead of concentrating on past shortages and future requirements for extended wars, a national policy on materials and stockpiling must concern itself with present conditions. Continued reliance on artifically limited and controlled foreign sources results in substantial increases in prices. Since these materials are used largely in defense industries, increased prices for them will obviously result in increased costs for weapons systems. And, given finite congressional appropriations, increased costs of weapons equate to decreased numbers.[11] One can then reach a rather simplistic yet valid conclusion that the increased cost of strategic materials and resulting decrease in the number of weapons produced equals reduced defense capabilities.

WHAT SHOULD BE DONE?

Policymakers should remember that increases in the prices of strategic materials are not necessarily products of traditional criteria based on "supply and demand." They may reflect concentrated efforts on the part of owning nations to exert a degree of influence out of proportion to their relative standing in the international community, either as individuals or as members of cartels. This is a natural phenomena; nations try to exert themselves in many ways. Policymakers should, however, remember that limited or interrupted supplies of such materials are always significant to the military whether at peace or at war. Furthermore the rise in peacetime costs of modern weapon systems and many consumer goods has an impact on the balance of payments and the dollar. In addition, dependence on foreign sources for certain materials does not necessarily always result from depleted supplies of domestic minerals. Instead, it may be a question of cost or availability. That is, resources may exist domestically, but laws prevent their extraction. Thus, policymakers should carefully scrutinize national policy on Federal lands - wilderness areas, national parks, etc. - and the numerous laws concerning health and safety.[12]

The absence of meaningful policy on materials, the inability to formulate such a policy over the past half century, and the increased U.S. dependence on foreign sources for many materials emphasizes the need for urgent action in developing, defining, and implementing a comprehensive materials program. The United States can take a number of actions to improve the situation. First, it can establish an effective materials policy by enacting necessary laws to monitor the use of materials and enforce national objectives. Second, it can create an apolitical agency, perhaps as independent as the Federal Reserve Board, to monitor and oversee the materials situation as it affects the United States. Third, it can require all government departments and agencies to coordinate directives and regulations affecting strategic materials with this proposed agency.

Such actions should then insure review of any new policies regarding materials in terms of their effect on the country's requirements for the materials. We are all aware that public emphasis has shifted significantly since the late 1960s and early 1970s toward ecological and environmental issues and has often ignored the implications of these issues for other segments of the economy. The enforcement of numerous edicts concerning health, safety, and pollution has had a negative impact on much of the development of industries using domestic minerals. Therefore, a single apolitical agency should be charged with tracking, monitoring, and coordinating all rules, regulations, laws, and directives that have an impact of any kind on the use of, or exploration for, minerals or materials necessary for the well being of the United States.

The Federal Government should also become more involved in expanded research and development aimed at conservation (reclamation efforts), substitution (finding alternatives for materials and techniques), and improved diagnostic and extraction techniques. Aside from outright research grants, tax incentives should be used to encourage private industry to participate, thereby greatly expanding the degree of effort.

Some of these actions have already been initiated on a limited basis. For example, a government project conducted by Pratt & Whitney has documented the benefits of strong salvage programs and General Electric's development of Korolox for internal components of jet engines has demonstrated the feasibility of substitutes.[13] The Pratt & Whitney study on scrap reclamation, scrap reclamation technologies and management systems was conducted over a five-year period - from March 1974 to May 1979 - and identified several efficient and cost effective processes for

nickle and titanium scrap. It also found that "some aerospace plants deny the existence of any scrap problem or treat their scrap metal like rubbish and dispose of it."[14] Most important, it demonstrated that reclamation technology currently exists and, with further development and widespread application, industry could reduce its demand for certain materials by salvaging and recycling available scrap.

Korolox is a new ceramic material developed by General Electric's Research and Development Center at Schenectady, NY, in an 18-month program. Hailed as "a major advance in the casting of high-performance superalloys for aircraft gas turbine engines," the breakthrough, according to spokesmen for General Electric, "will, for the first time, permit the manufacture of hollow, intricately shaped jet engine components from oriented eutectic superalloys - which are among the toughest, most heat-resistant alloys known to man." Although still in the development stage, such superalloys show great potential for components of engines being developed for the 1980s, and "their higher-temperature capability could yield engines with about 1 percent greater fuel efficiency and up to 17 percent more thrust."[15]

While these examples represent steps in the right direction, they also reinforce the need for a comprehensive national policy. Both programs were sponsored (and paid for) by the Air Force Materials Laboratory and demonstrate Air Force efforts to resolve or reduce the problems of skyrocketing costs and shortages of materials essential to the aerospace defense industry. Other services have sponsored similar programs in an effort to obtain affordable weapons systems. These are laudatory actions representing pragmatic approaches to resolving the problem, but, in a national sense, they underscore a national shortcoming. Dollars allocated for defense should be spent for weapons systems, personnel, operations, maintenance, etc., and not for resolving a national problem directly or indirectly affecting all segments of the population. That sort of effort dilutes the national defense dollar.

Also, recently, some Congressmen have again begun to voice concern over the strategic materials problem and have even initiated limited action. For example, the 6 August 1980 edition of *Defense Daily* reported: "Legislation to require the president to develop a long-range plan within a year to ensure the adequate supply of minerals essential to the 'defense, economy and quality of life' in the U.S. has been introduced by Rep. Beverly B. Byron (D-Md.)"[16]. Congressman Jim Santini (D-Nev), Chairman of the House Interior subcommittee on mines and mining, has also long advocated strong government action in this area. Santini again called attention to extensive U.S. dependence on imported materials and the status of a government position during a news conference in August 1980: "There is not a national plan or policy regarding the minerals essential to our very survival."[17]

Although efforts by at least some members of Congress are welcome signs, they have not yet led to a definite national policy. For that matter, legislation requiring the President to develop a plan may be a classic case of buck passing that imposes impossible requirements on the President without substantial support from Congress. On the other hand, Congress itself has been responsible for many laws that have either curtailed or virtually eliminated the mineral industry in this country. The United States can never be totally self-sufficient in strategic materials simply because some of the materials are not located within its boundaries, but Congressional action has limited the availability of many such materials, particularly in areas managed by the Federal Government. In testimony before the House Interior subcommittee on mines and mining, General Alexander M. Haig, Jr., former commander of NATO forces in Europe, stated: "By the actions of our own government, fully two-thirds of our mineral lands have been withdrawn from possible exploration."[18] And so, at a time when there should be massive efforts by all concerned, including substantial government involvement, toward reducing our dependence on foreign sources for strategic materials, development of domestic sources is being effectively blocked by Federal land management policies.

WHAT LIES AHEAD?

Although not conclusive, Figure 2 reflects a frightening dependence on foreign sources for strategic materials, but this trend has been overshadowed by public concern over the price of imported oil. Even when it is considered, people tend to view it through much of the same panic mentality as they view the price of oil. Primary concern for all such commodities is apparently expressed as fear that sources of the commodities will suddenly be disrupted or terminated: "What will happen when the valve is turned off?" Such attitudes are unrealistic and fail to focus on the real danger.

A sudden cessation of materials shipments by producing nations would represent a direct attack on the American economy and would probably be interpreted as a "death blow" aimed at the United States. In other words, it would be an act of war requiring an appropriate response and, for nations engaging in such actions, it would also be a case of cutting off their noses to spite their faces, since for many of them, the sale of such materials represent the sole or primary source of national income. More realistically, nations possessing strategic materials can be expected to follow the OPEC example. That is, by implementing a series of gradual price increases, they can retain markets for such goods and increase their national wealth. One is not overly dramatic in stating that such a policy will slowly bleed and ultimately destroy America's defense efforts. Only the cooperation of a concerned citizenry, dedicated government, and pragmatic technologists can rescue us now. Perhaps they soon will be ready.

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Project Warrior

Project Warrior is the name of a series of proposed initiatives the Air Force is working on to create and maintain an environment for Air Force officers "to (1) think and plan in warfighting terms, (2) identify ways to improve the warfighting spirit and perspective in the officer corps and (3) encourage an improved understanding of the theory and practice of war." Air Force Chief of Staff Gen. Lew Allen Jr. said: "It is important that the Air Force officer corps develop a keen understanding of the art of war. Although Air Force officers are continuously involved in efforts to build and maintain a credible national defense, all too frequently our focus is oriented toward accomplishing the immediate tasks at hand without adequate attention to the warfighting dimension of possible future conflicts."

Logistics Warrior

Logistics Warrior is the contribution of your journal to help create that environment. Your suggestions are solicited.

LOGISTICS WARRIORS: Alexander the Great

"The major problems in attempting to understand the logistic system of the Macedonian army is not only the almost complete lack of interest by our sources in its functioning but also the fact that Alexander so capably directed its operation that logistics scarcely seems to have affected any of his strategic decisions. Yet, a deeper analysis shows this latter view to be false. Supply was indeed the basis of Alexander's strategy; and when the climate, human and physical calendar of a given region are known, one can often determine what Alexander's next move will be.

The Macedonians' logistic organization, developed by Philip, was fundamentally different from that of contemporary Greek and Persian armies. In Greek armies, the number of followers often approached the number of combatants; and rations, arms, and armor were carried by servants or baggage animals. Philip trained his soldiers to carry their full panoply as well as provisions, and he forbade carts and women to accompany the army. Much equipment was carried by a limited number of servants rather than by carts or pack animals. The consequence of Philip's reforms, which were continued as far as possible by Alexander, was a dramatic reduction in the size of the baggage train, and this had a momentous effect. It made the Macedonian army the fastest, lightest, and most mobile force in existence, capable of making lightning strikes 'before anyone had time to fear the event.' Alexander's astonishing speed, which so terrified his opponents, was due in no small part to Philip's reforms. Because many supplies were carried by the troops and a restricted number of servants, the Macedonian army would need far fewer pack animals than would other contemporary forces, which would reduce the problems of acquiring sufficient animals and feeding them among populations engaged in subsistence agriculture. In short, the logistic organization of Alexander's army was brilliantly adapted for campaigning in Asia, where the acquisition of pack animals and provisions would often be difficult in barren terrain and where speed and mobility were important tactical advantages.

The two most significant obstacles to the supplying of the army were the limited capabilities of overland transportation and the subsistence level of most agricultural production in antiquity (which in turn was caused in large part by a lack of efficient transport). Because of the limitations of transport, the army could not remain self-sufficient for long distances when remote from navigable rivers or seaports. Hence, arrangements for the army's supply were made in advance with local officials, who regularly surrendered to Alexander before he entered their territory. In regions where local geographical conditions made the acquisition of supplies particularly difficult, Alexander would often take hostages or establish garrisons to insure their efficient collection. When he entered the Iranian heartland, however, few surrendered to him in advance, and the army's provisioning problems were intensified. Alexander would never commit his entire army for a campaign into a region that had not surrendered to him in advance. Instead, he would first obtain intelligence concerning the routes, climate, and resources of the country and then strike out with a small, light force, while the main army remained behind at a base well supplied with provisions. Alternatively, he would divide the army into smaller units so that their diminished requirements could be more easily provided during their advance through the countryside. Supplies at such times would not be provided by markets, gifts, or requisitions, as before, but by pillaging towns and villages or foraging. Advance intelligence was always an essential factor in Alexander's successful operations."

From: Alexander the Great and the Logistics of the Macedonian Army by Professor Donald W. Engels, Wellesley College.

LOGISTICS WARRIORS: The US in Iran

"Commando operations are like all other infantry operations, only more so. They do, however, have their own rules, which the rescue attempt seems to have violated in every respect. The planners involved were, undoubtedly, good managers, economists, engineers, or whatever. But they must also have been quite ignorant of the military history of forty years of British, German, French, and Israeli commando operations. Otherwise, they would not have sent such a small force into action. Here the rule is: "a man's force for a boy's job." Deep in enemy territory, under conditions of gross numerical inferiority, there must be a decisive superiority at the actual point of contact, since any opposition must be crushed before others can intervene to eventually subdue the commando force; there is no time for a fair fight.

If the planners had not been ignorant of the history of all military operations, let alone commando operations, they would not have had three coequal commanders on the spot, and then a "task force" commander back in Egypt, not to speak of the Joint Chiefs, the Secretary of Defense, and the President—all connected by satellite. Here the rule is that there must be unity of command, under one man only, since in high-tempo commando operations there is no time to consult anyway, while any attempt at remote control is bound to be suicidal given the necessary speed and secrecy of such missions.

If not for this ignorance, the planners would not have relied on a few inherently fragile helicopters. Here the rule is that since the combat risks are, by definition, very high, all technical risk must be avoided. If helicopters must be used, let there be twenty or thirty to carry the payload of six.

If the planners had had any knowledge of these affairs, even of the one in which Americans had performed before, they would not have assembled a raid force drawn from different formations and even different services. Here the rule is that commando operations, being by definition exceptionally demanding of men and morale, must be carried out by cohesive units, and not by ad hoc groups of specialists. That, indeed, is why standing units of commandos were established in the first place. If the suspicion is justified that the fatal accident was caused by a misunderstanding or worse between Marine helicopter pilots and Air Force C-130 pilots—and that procedures, technical jargon, *et cetera*, are different—those involved carry a terrible responsibility. For there is much reason to believe that all four services were involved in the raid precisely because each wanted to insure a share of any eventual glory for its own bureaucracy."

From "On the Need to Reform American Strategy" by Edward N. Luttwak in *Planning US Security* edited by Philip S. Kronenberg

LOGISTICS WARRIORS: The RAF in Kuwait

"The supply organization learned many lessons which were to prove of immense value for the future. It was the first occasion upon which the stockpile at Bahrein had to be used in earnest, and the near impossibility of maintaining many delicate items of equipment in a serviceable condition under the circumstances was clearly demonstrated. Not only did radio equipment suffer badly from corrosion, but the high humidity in the Gulf seriously affected stocks of blankets and clothing as well as such perishable items as tyres. If stockpiling was inevitable, *VANTAGE** proved not only that it had to be restricted to the minimum holdings, preferably of non-perishable items, but also that all items in a stockpile needed to be turned over at fairly short intervals. This latter requirement was very difficult to meet as, for example in the case for *HUNTER* long range fuel tanks. The Bahrein stockpile contained a huge 'wall' of several hundred tanks in wooden crates, some of which would certainly have been needed had Hunters been required to operate at extreme range from Bahrein. The normal peacetime consumption of such tanks was small as they lasted indefinitely if not dropped, and it was therefore impossible for two squadrons to turn over several hundred tanks economically. Hindsight again showed that the provisioning of these tanks had been on far too lavish a scale.

The type of container used for stockpiled equipment came in for review at this time. Most of the Bahrein stockpile had been built up in a leisurely fashion by sea, necessitating robust cases and shockproof packing for the more delicate equipment—and this applied to the majority of it. However, when brought into use, much of the equipment needed to be moved on to Kuwait by air and then the heavy cases proved a great waste of valuable airlift. Repacking of heavily cased equipment within the stockpile was not only a waste of manpower, but it also exposed material to the elements and tended to destroy much of the proofing which had been originally applied. Experiences such as that provided by *VANTAGE* enabled great advances to be made by the supply organization in light-weight but shock-proof packing of all kinds of equipment. Not only the packing but also the marking of cases created a number of problems from which sound lessons were learned. The planning of *VANTAGE*, like any other operation had called for strict security but there was an inevitable tendency to overdo this, and to allow the security to penetrate right down to the most mundane matters; every case packed for *VANTAGE* had a complicated set of coded numbers and letters stenciled on it, indicating its contents and the part it played in the Movement Tables. Before unpacking or moving every case, therefore a long classified coding list had to be consulted to check details of the particular crate. This was a lengthy and time consuming procedure, one example of which illustrates how unnecessary much of it was. In the heat of the initial move, one supply officer at a [Kuwait operations base] had temporarily mislaid his list of code references, and it was necessary to open no less than 130 cases in order to find some cutlery for the airmen's mess. There was obviously no reason why details of such items could not have been stenciled on the case, but the imagination needed to visualize the situation which arose was lacking in the remote atmosphere of a planning office, with the result that everything had the same security grading applied to it."

*Operation *VANTAGE* was the code name for the RAF involvement in Kuwait in 1961.

From: *Flight from the Middle East* by Air Chief Marshall Sir David Lee, GBE, CB, RAF.

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